A DIALOG ON ....

..... THE HASSELBLAD 500 C & CM

PHOTOS & DISASSEMBLY BY: KENNETH PARCHINSKI

SERVICE INFORMATION BY: KENNETH PARCHINSKI, BILL CARN, DICK CARSON, DIETER ROKAHR, RAMON ELLER, AND OTHERS

(Ed. Note: This dialog reads as though the above "cast of characters" had gathered around a bench to make comments while Ken Parchinski disassembled a Hasselblad 500 camera. However, since these technicians are scattered from the East Coast to California, they did not meet! Ken Parchinski did the real work: disassembling the camera, shooting the photos, labeling the parts, writing the core of the service information. Photos and text were then sent to other interested technicians, who added their own experiences and comments. These were incorporated into a dialog-style draft which was redistributed to the participating technicians. After a couple of more rounds the almost-final draft was sent to the U.S. Hasselblad distributor, Braun North America, for proofreading from a technical standpoint. I, too, appear in this dialog; however I assure you that I know absolutely nothing about repairing Hasselblads. In this dialog I represent the "and others" in the above list of participants and express viewpoints which are commonly held but are anonymous for purposes of this article.)

PARCHINSKI: Hasselblad is a long-time favorite of the pro and advanced amateur. Even though high-priced they sell very well. Hasselblad is a lightweight, dependable 2 1/4 square system with a wide range of lenses, film backs, hoods, meters, bellows, extension tubes and accessories. Hasselblad also has a motor drive camera, (500 EL/M,) and a super wide angle camera, the SWC. The Hasselblad 500 CM is very close to the 500 C. One of the main differences is that the 500 CM has easy-to-change, interchangeable viewing screens. Also, the later model 500 CM's eliminated the auxiliary shutter flash outlet on the body, which had been used with lenses that don't have shutters...

CARN: ...the now Hasselblad 1000 F series..

JONES: Some SPT members have said that repairing Hasselblads is good business because they're a professional's camera receiving hard and constant use. So you can profitably service Hasselblad equipment for just one or two accounts on a regular and continuing basis.

CARSON: The Hasselblad is actually one of the easiest cameras I know of to repair. It is a beautifully simple mechanism -- little to go wrong.

CARN: But servicing the Hasselblad 500 camera is deceptively simple because the pitfalls are not obvious. Though there have been some obvious changes internally over the years, these don't cause serious problems. As a system camera, the most critical areas of the mechanism are in the adjustment and timing. While the Hasselblad company has some very sophisticated alignment tools and jigs, many of the repairs can be done in a well-equipped shop. But some can't. The real problem areas would encompass: mirror alignment, focusing screen position, shutter coupling / drive. With a little care most repairs on the Hasselblad body can be accomplished. Because of couplings to magazine, shutter, etc., the alignment is critical, so be careful.

ROKAHR: However a lot of people are wrongly scared out of trying to repair the camera at all. I once was. You hear that in order to adjust it properly you need thousands of dollars worth of special tools and jigs, so you feel intimidated. So you don't try it until one day someone stands over you and says, "I don't care what you do or don't have -- just fix it so it works right for me!" Then you find you actually can.

PARCHINSKI: Here are a few points before starting disassembly.

FIGURE 1

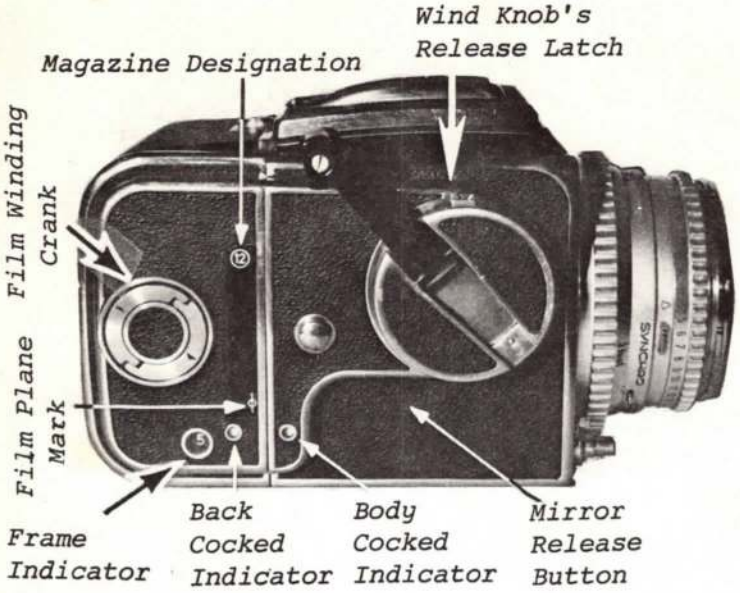
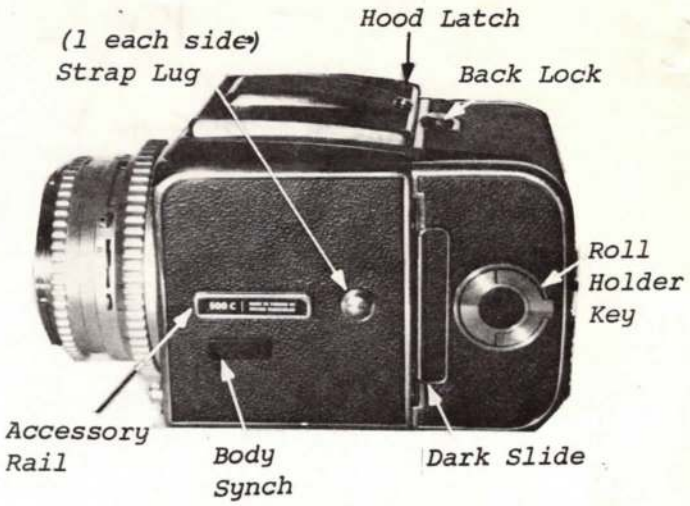


FIGURE 2



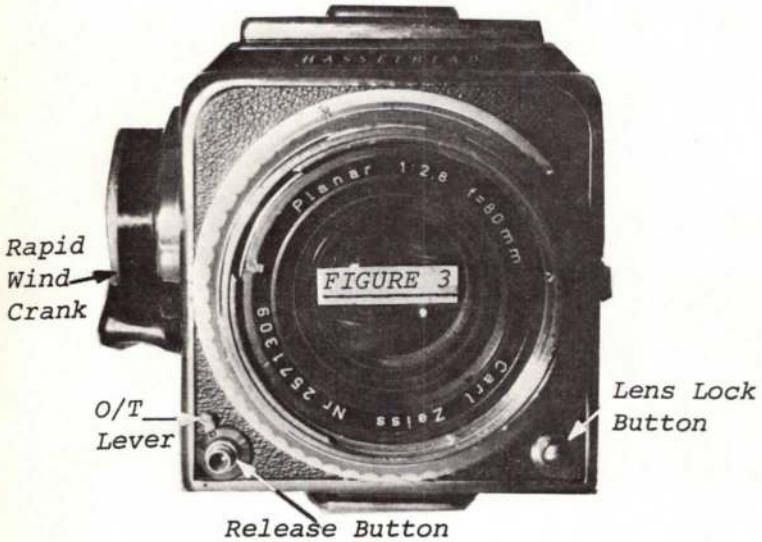


FIGURE 3

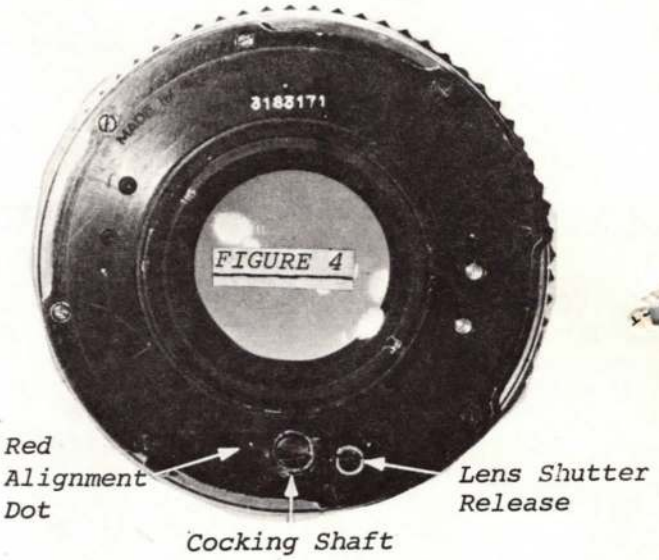


FIGURE 4

FIGURE 5

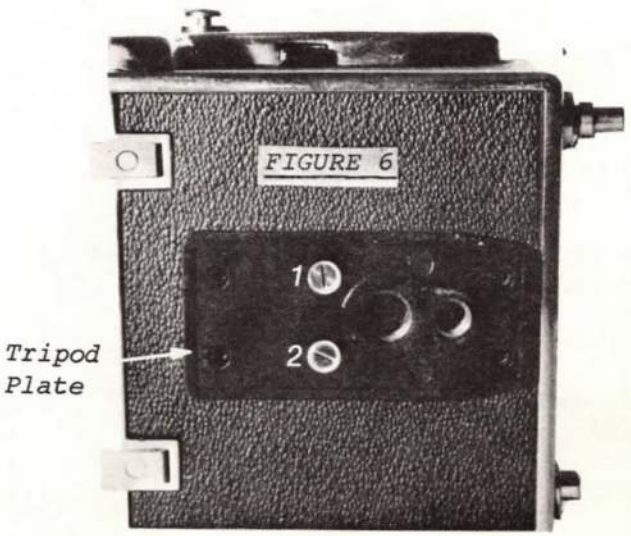


FIGURE 6

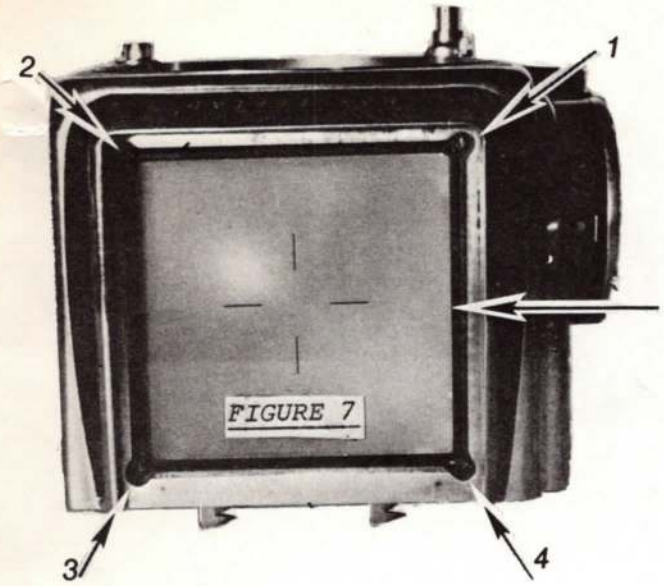


FIGURE 7

Lens: Make sure the body is cocked before trying to remove the lens. The same goes for installing the lens -- the body and the lens must be cocked.

Backs: You must have the slide in to remove the back and the slide out to release the shutter or body. Cock the back or the body before installing the back, except for deliberate double exposure.

Hood: You must remove the film back to remove the hood or meter.

As we start disassembly, Fig. 1, 2 and 3 show the front, top and both sides of the Hasselblad 500 C with features as shown. The photos in this article, by the way, are not a screw-by-screw disassembly. These particular photos were chosen to best point out the various components discussed.

CARN: If the back catch plate in Fig. 2 needs straightening, don't straighten it while the plate is in the body. Remove the body shell and the plate before attempting to straighten. Otherwise the back body casting will break. This is an extremely expensive assembly to replace.

PARCHINSKI: Fig. 4 is the rear of the lens. Three important items are the red alignment dot, the cocking shaft, and the lens shutter release. In the next series of photos we will separate the body and the outer shell. In Fig. 5, remove the cover plate by removing the four screws. In Fig. 6, remove the tripod plate by removing two screws. In Fig. 7, at times when disassembling the shell may stick on the screen. If that happens then you must remove the screen by the four screws as marked.

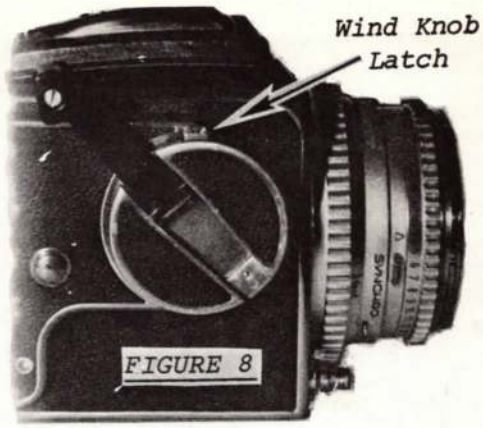


FIGURE 8

CARSON: Screw each of the four holding screws in only one and one-half turns or two turns against the body shell. Then, after repairs are made, you can just back the screws out the same amount and will not have to completely refocus and adjust the leveling.

PARCHINSKI: I always tighten down the screws all the way and count the number of turns, then, remove. Installing is easy. Tighten the screws all the way down and back each screw until the focus is right. The screen should be level at this point if you were careful.

ROKAHR: Yes, counting screw turns is indeed helpful in getting you back in the ballpark, and this may be all you need. But a check with the autocollimator sometimes shows I've put it back at precisely the same wrong setting that someone else had it at, so I have to adjust with the collimator.

PARCHINSKI: In Fig. 8, remove the winding crank by pressing the wind knob latch and twist the knob and remove it. In Fig. 9 remove the shoulder screw and remove the plates. In Fig. 10, the side is shown with the plate removed. In Fig. 11, to separate the body from the shell you must push the inner body from the front to the rear of the shell.

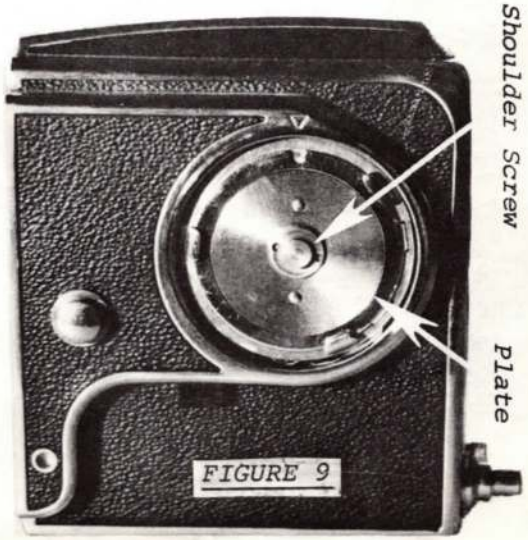


FIGURE 9

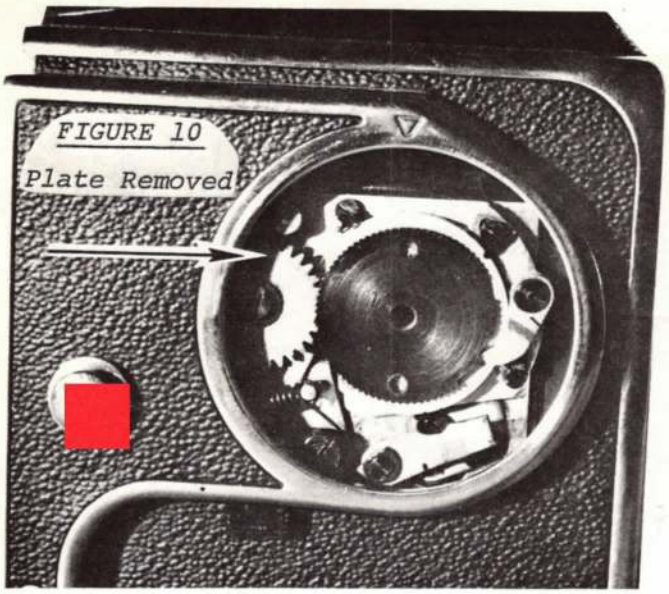
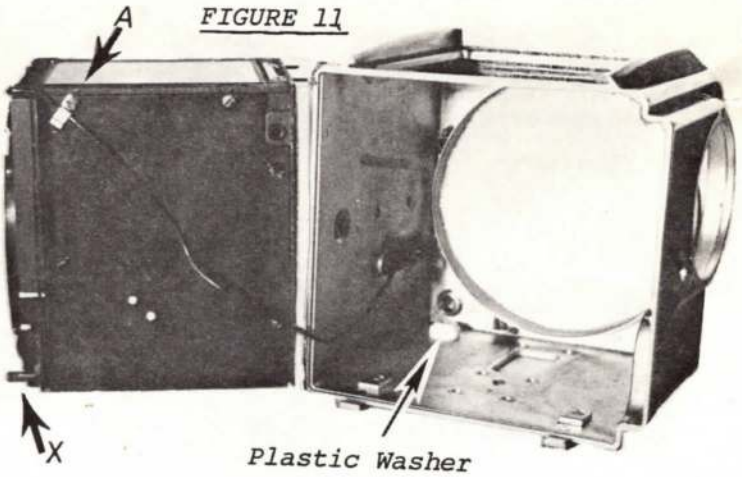


FIGURE 10
Plate Removed


A
FIGURE 11
X
Plastic Washer

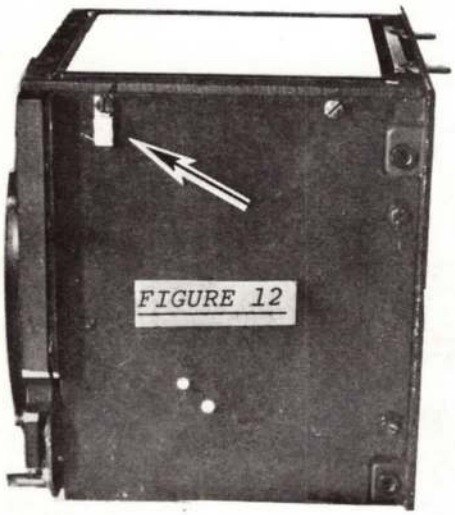


FIGURE 12

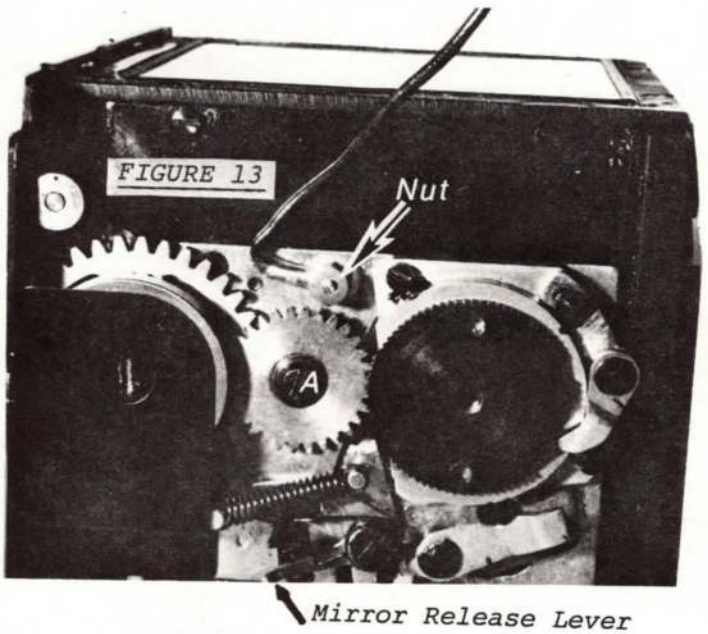


FIGURE 13
Nut
A
Mirror Release Lever

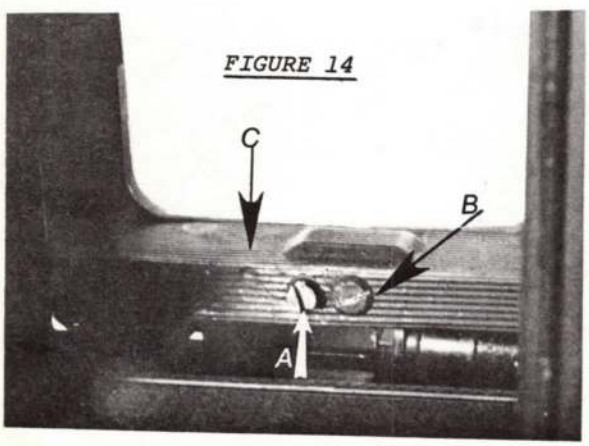


FIGURE 14
C
B
A

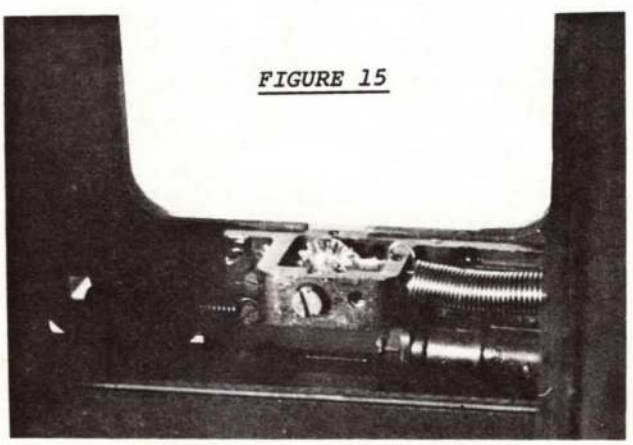


FIGURE 15

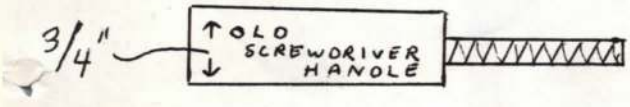
CARSON: Press inside the lens mount on the left side. This allows the stop-down lever to disengage as the body slides out to the right.

CARN: When removing the mechanism from the body you can release the synch wire from the body synch socket.

PARCHINSKI: Usually the plastic washer and button will fall out. The plastic washer will fall out of shaft X, (bevel towards inner body). Loosen screw A and remove the wire from under the clip. In Fig. 12 tighten the screw so you won't lose the screw or clip. In Fig. 13, remove the nut and the wire, then replace the nut. Now the shell and the inner body are completely separated. Set the shell aside. By the way -- some Hasselblad 500 CM's have no body synch wire.

CARN: Don't remove Screw A in Fig. 13 unless you intend to remove the mechanism plate. The timing/tension of the rear shutter/baffle spring can be made without removal of this gear.

Also -- at this point note that you can make a winding tool for the mechanism which permits easier operation (cocking the shutter) when the mechanism is removed from the body. In this diagram, the diameter of the screw is 3 mm, length is 5 mm, and pitch is 0.5 mm.



SCREW MADE OUT OF WINDER SHAFT OF OLD SCREWDRIVER

PARCHINSKI: On the shutter/baffle -- I prefer to call this a shutter blind because that's what I'm used to seeing in manufacturers' manuals.

ELLER: I prefer the term shutter over the word curtain, which is sometimes used.

CARN: Since this does not really serve the function of a shutter or a curtain, myself I prefer the word light baffle -- because that best describes its function.

PARCHINSKI: But a baffle is a light shield which is usually on the back of a shutter someplace. So I prefer to use the factory's term -- a shutter blind.

JONES: As long as we're all talking about the same thing, regardless, let's get on with it!

PARCHINSKI: In Fig. 14, you see cocking shaft A. Many times a Hasselblad can be unjammed without disassembly. Remove the film back; press the lower shutter blind down to expose the shaft. Cock the shaft...

CARSON: ...clockwise...

PARCHINSKI: ...with a long screwdriver.

ELLER: It helps to mount the body on a tripod screw (1/4" - 20) which is clamped in a vise. This frees both hands so you can turn the shaft while rotating the lens back and forth (and sometimes simultaneously depressing the lens button) until the lens is either cocked and lcoked (as normal) or removed.

PARCHINSKI: Cocking the shaft will allow you to cock and remove the lens. To expose the parts underneath, remove screw B and cover C. In Fig. 15, the cover plate is removed and parts are exposed for cleaning and lubrication. In Fig. 16, to expose under the side plate remove the screw and plate. You can make a screwdriver to remove the screw by grinding one at a 45 degree angle for this screw. The plate takes some wiggling to remove.

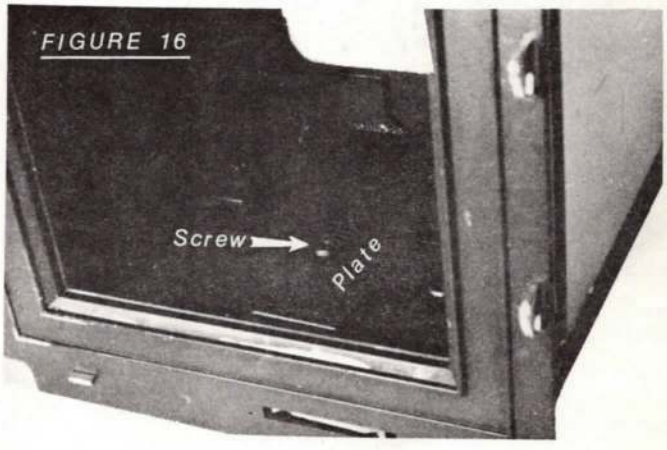


Fig. 17 shows the mirror control parts exposed. The mirror latch holds the mirror down until it is released. The cam turns while the shutter cocks and pushes the lever shown, which connects to the mirror plate, and the mirror is forced downward under the mirror latch. In the cocked position, the lens locking pin is pulled back by the lever's position, allowing you to remove the lens.

FIGURE 17

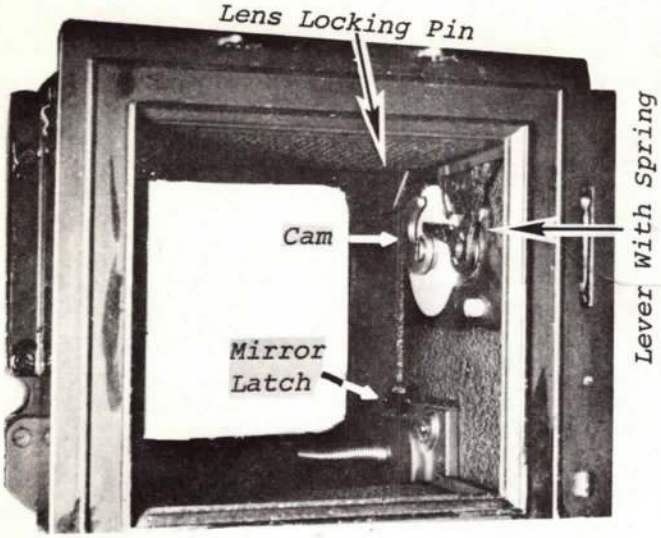


FIGURE 18

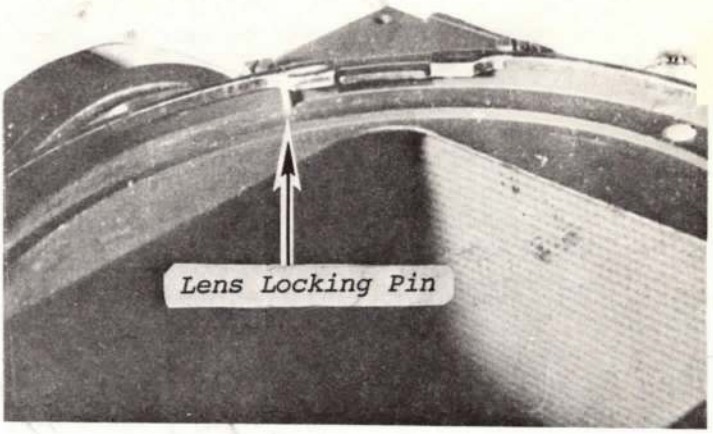


FIGURE 19

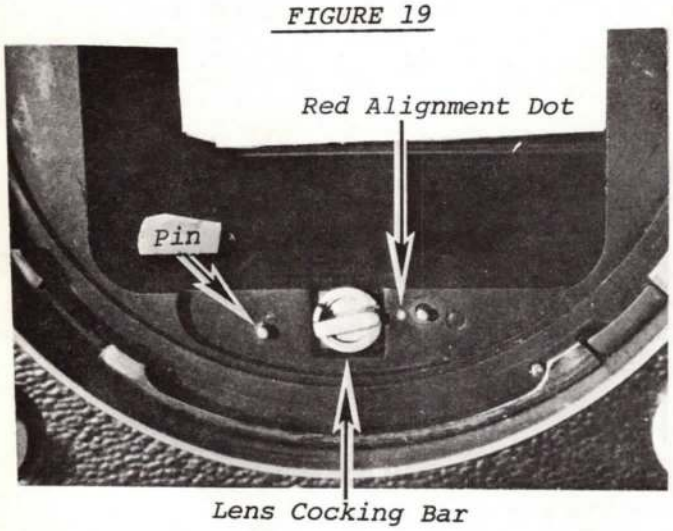
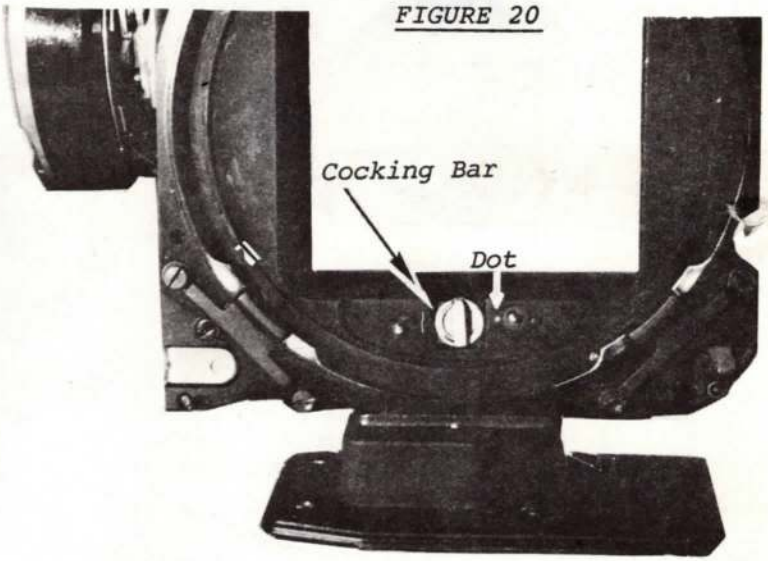


FIGURE 20



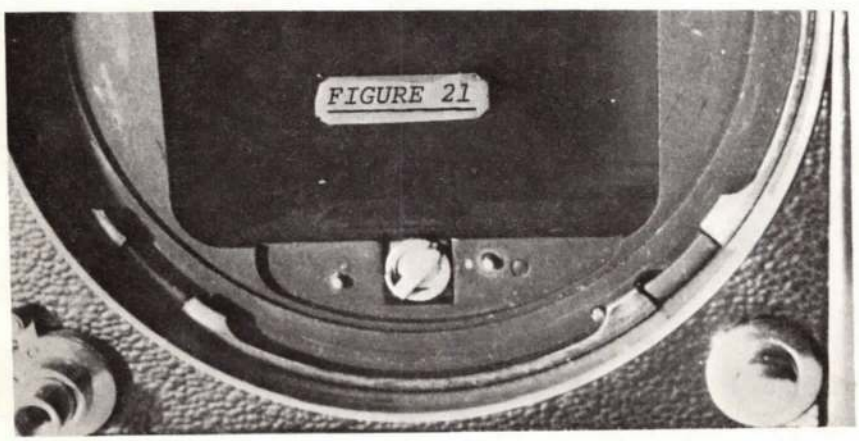


FIGURE 22

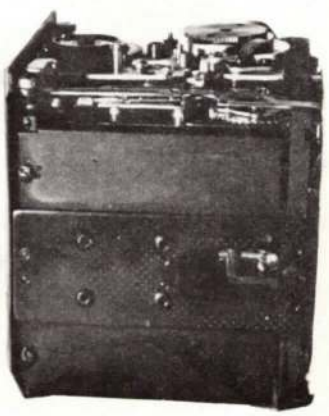
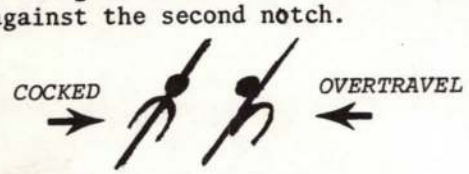


Fig. 18 shows the upper left corner. The lens locking pin is visible as the body is in the release position. Upon cocking the body, the lens locking pin is withdrawn.

Fig. 19 shows the lower front of the camera. In this figure the lens cocking key with the round gear is directly pointing at the red alignment dot. This is the fully cocked position. The pin marked releases the shutter as soon as the shutter is in place. The only thing holding the shutter open and not releasing the lens is the cocking key which now has complete control of the lens shutter cocking and releasing.

CARN: On Fig. 19 and the red alignment dot -- you can't use the red dot to align the shutter cocking bar. You can't say that is the correct, cocked position of the body key (shutter cocking bar) using the red dot only. You should use the special Hasselblad alignment tool or you don't touch it. Adjustment of the shutter winding key is made with the intermediate gear (Fig. 24). Maximum adjustment is approximately 1/2 tooth. In Fig. 24 you need to know the adjustment and engagement positions of the intermediate gear and in Fig. 19 you need the correct position of the lens cocking bar. It's important to know the spring tension for the shutter/drive assembly. This is 2 1/2 turns, if I recall.

PARCHINSKI: I found that on most Hasselblads when you cock the camera the cocking key slightly passes the red dot. When you take your hand off the crank the key should align with the red dot and the gear should move back so the pawl rests against the second notch.



JONES: What most technicians say they do is this: Put the lens on. Since the customer's own lens may be off, it's best if you have a standard lens which you know is right to use as a gauge. When it is in the fully-cocked position this automatically aligns the body key to the correct position. Then if the intermediate gear is out of time you disconnect the gear and reset it to the correct position, which is easy to find just by trial and error (though time-consuming if you don't have Hasselblad's special tool).

CARN: However -- longer lenses require more accurate alignment of that key because of their longer internal linkage.

JONES: Oh yes -- technicians say that you adjust the gear with the lens on in the cocked position because that gives the correct wind-up position of the camera -- assuming the lens is OK. Without the lens you'll have the overtravel Ken mentioned earlier. With the lens on there should be MAYBE one degree overtravel. But suppose in addition to the standard lens your customer also has a long lens. You should check the body with this on the camera to make sure there's enough shutter-setting wind up to cock this lens, too. It's possible (though rare) to have enough wind to cock the normal lens but not quite enough to cock a 500 mm lens.

Also, they say that although it's very unusual, wear on the gear or the parts it interfaces with may cause the camera to not function properly during the gear's turning cycle -- in which case you may have to change the worn parts.

If you strip to replace parts or for other reasons, you need to replace shutter timing: (1) in the body (using a standard lens, as just discussed); (2) in the shutter. Once you have the body right you put the shutter on the body. If the shutter timing is insufficient or over you put in a different pinion gear. Hasselblad has 13 of these pinion gears, which they say have to be set up with Hasselblad's special tool. These gears are PN-702-523-1 through -13, inclusive. People say you need a stock of about the six most commonly used: the top one, the bottom one, and four around the middle or bottom third. For more details, read the Compur 1240 manual.

PARCHINSKI: In Fig. 20, the lens cocking key is shown in pre-released position. In Fig. 21 the lens cocking key is the completely released position. Fig. 22 is a view of the bottom -- no moving parts. Fig. 23 is a side view of the wind mechanism in release position. Note the few parts the Hasselblad uses. Fig. 24 is a

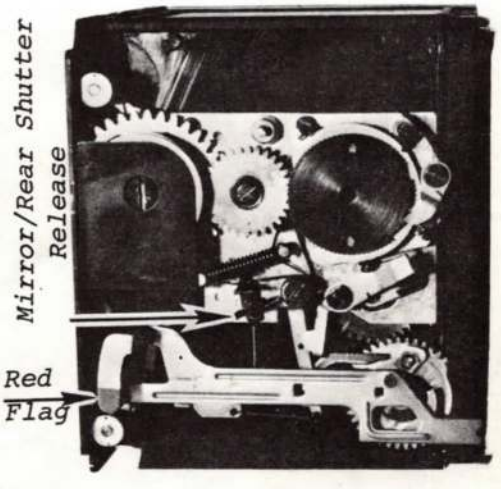


FIGURE 23

FIGURE 24

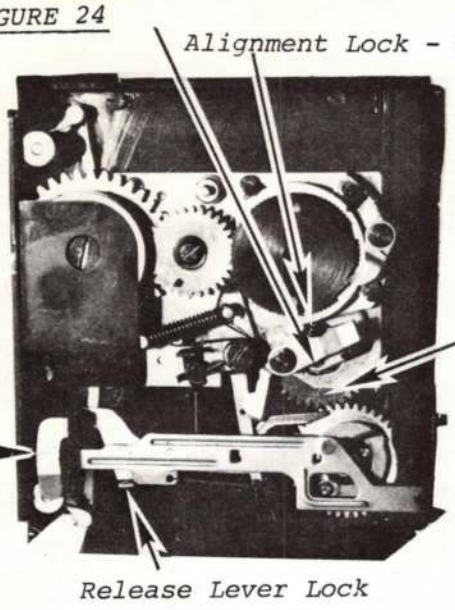
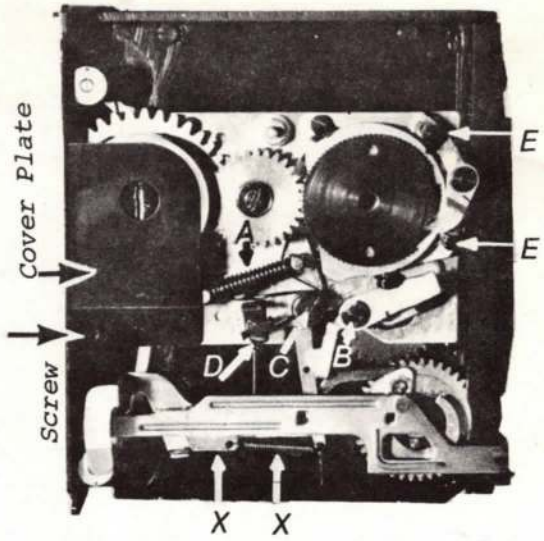

Alignment Lock - Screws
White Flag would be visible through window.
Intermediate Shutter Wind Gear
Note: Tooth engagement is too loose in this photo.
Release Lever Lock

FIGURE 25



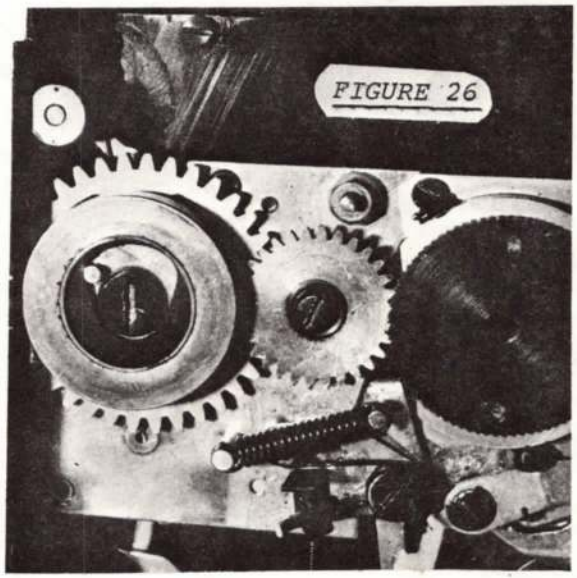
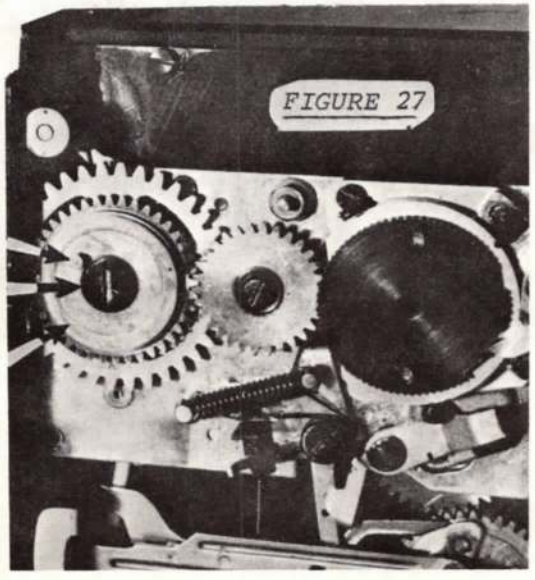
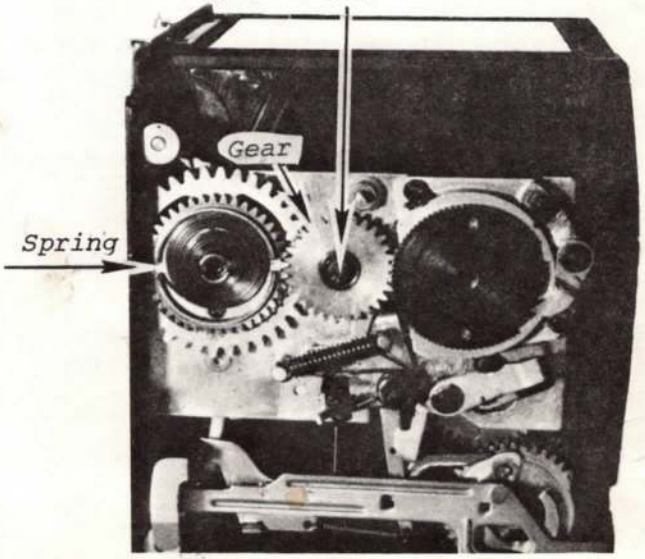


FIGURE 28

This screw holds the mirror setting lever which will disengage if undone & the shaft (screw hole) pushed in.





side view in a cocked position. I had very few cameras with broken parts and it seems springs break more than any other parts.

In Fig. 25, remove the screw and the cover plate. At this point you can stop for routine cleaning and lubrication. Many repairpeople flush clean major parts without disassembling any further.

In Fig. 26, remove the inertia brake. In Fig. 27, remove the screw plate and note the position of the pin in the camera. In Fig. 28 the spring is exposed. This inner shutter/baffle-return spring seems to break most. If the spring breaks, the inner shutter/baffle won't close. Remove the spring. On reassembly, give it enough tension to close the inner shutter/baffle with a snap. Remove the screw and intermediary gear.

JONES: Also, if you don't know the spring tension on the body shutter/baffle assembly, a tried and true method some technicians say they use is to check mirror sequence / release sequence to see that the shutter/baffle clears when the shutter fires. If it doesn't clear it may need more tension. If there's too much tension the spring will overwind. Therefore, they say you should start with it too loose and slowly adjust tighter. If you overwind the spring it will stretch so you'll have to replace it, which is a pain in the neck.

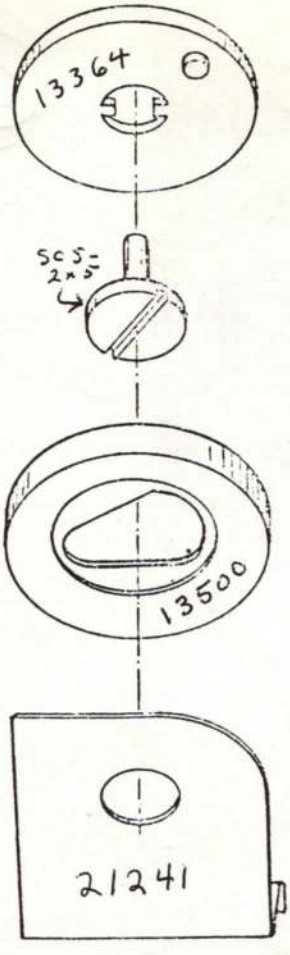
ELLER: I have seen quite a few bodies where the brake had been removed!

CARN: A common problem, until recent design changes, is the sticking of the body shutter/baffle assembly. With a modification kit from Braun this can be virtually eliminated. Every model can be modified except those using the air retard. A coversion of the brake assembly is not time consuming or complex.

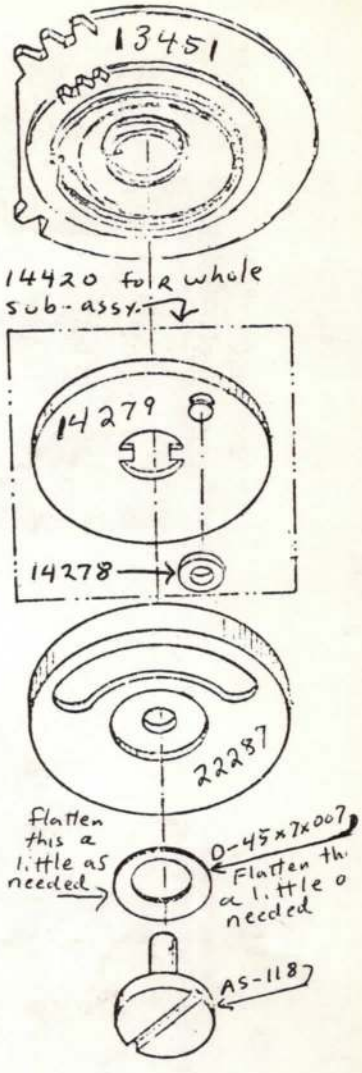
Also note -- the body shutter/baffle can be bent inward and does not close. These should be light tight. If a small tightening is required this can be done while holding the bearing shaft end and gently reshaping the baffle.

JONES: Fig. Z shows Hasselblad's drawing of the old and new brakes. You sometimes need to flatten part no. D-45 x 7 x 007, a little bit. Also, parts 14278 and 14279 can be ordered both together as part no. 14420.

PARCHINSKI: In replacing the brake, look at Fig. C which shows the parts in order. To remove the screw release the shutter and turn the screw counterclockwise.



OLD BRAKE ASSY.



NEW BRAKE ASSY.

FIGURE Z

CONVERSION KIT

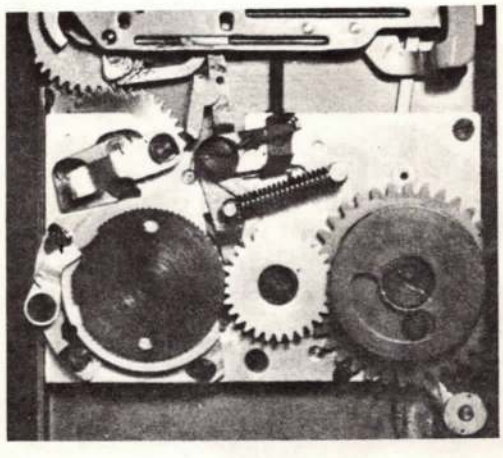
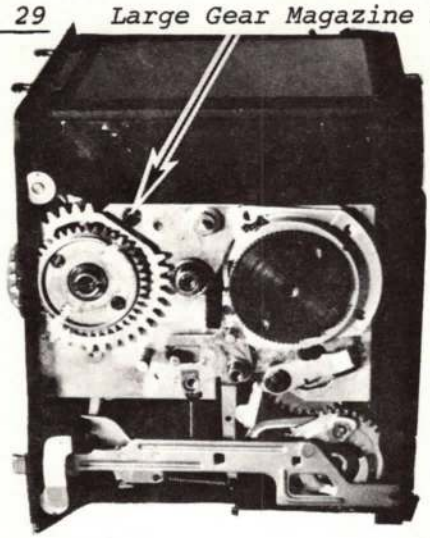


FIGURE C -- BRAKE ASSEMBLED

FIGURE 29 Large Gear Magazine Drive



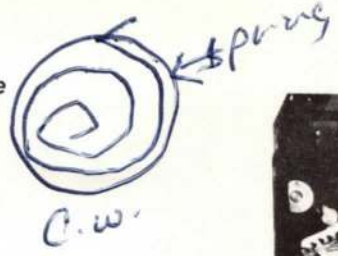


FIGURE 30

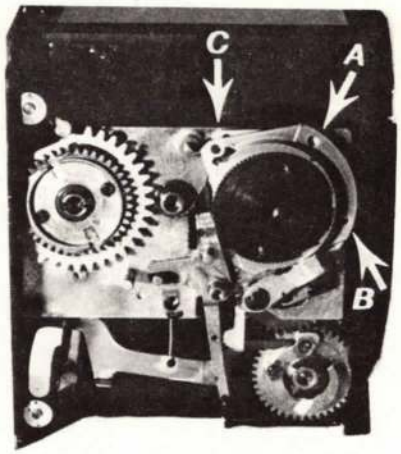


FIGURE 31

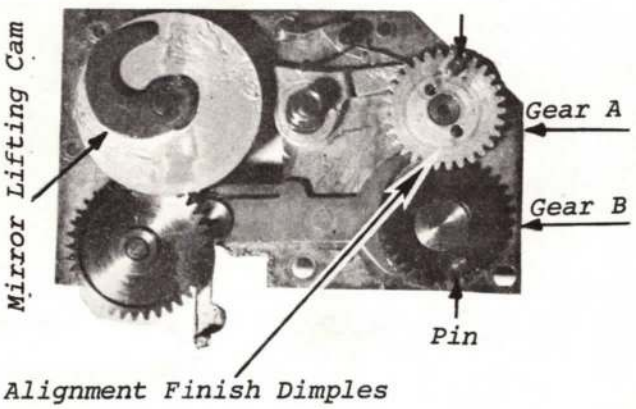


FIGURE 32

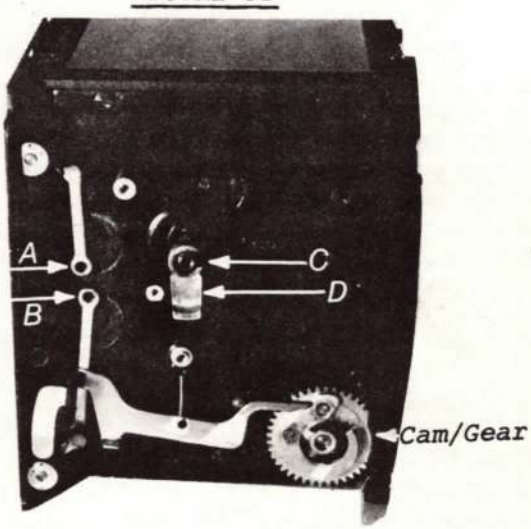
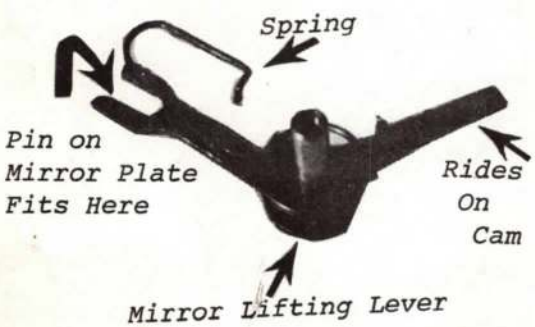


FIGURE 33



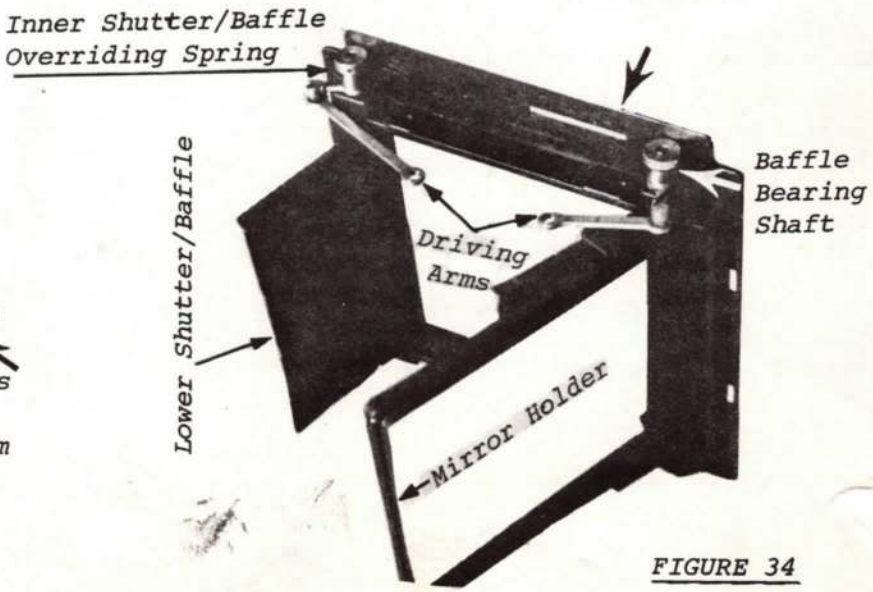


FIGURE 34

The gear shown in Fig. 29 has a flat spot with no teeth on one side. This gear advances the film if you have a film back on your camera. In the fully-cocked position the flat spot should be parallel to the back of the camera.

Now we refer back to Fig. 25 to remove the springs, levers, and release slide. Remove the parts marked A, B, C, D, E, and X.

In Fig. 30, remove screws A, B and C if you have not already done so. Remove any other parts interfering with removal of the wind mechanism plate. In Fig. 31 the rear side of the wind mechanism plate is shown. Most parts are rivited to this assembly so no further disassembly is required unless there is a part broken, which is very unlikely. Gear A drives the upper inner shutter blind (shutter/baffle) and gear B drives the lower one. The pins on gears A and B fit into holes in the driving arms of the inner shutter blinds (shutter/baffle) as shown in Fig. 34.

In Fig. 32, parts A and B are inner shutter blinds (shutter/baffle) driving arms. Parts C and D are mirror driving and lifting parts. A close-up of part C is shown in Fig. 33. The cam/gear drives the shaft with beveled gears and the shutter cocking key. This gear is turned one way to cock the shutter and then the other way to release it. You should scribe a line across the cam/gear and connecting gear for reassembly. This cam/gear usually has two to two-and-a-half turns of tension on its spring. Since Hasselblad has very few parts there is less to break!

CARSON: In reassembly of the body into the housing, the mirror release lever, in Fig. 13, will have to be lifted above the button arm in the housing. With the unit in the cocked position, slide the body into the case. With the aid of a shaft tool the body lever can be lifted through the knob hole in Fig. 10.

JONES: How about collimation? I see that flange/back rails distance is 74.9 mm.

CARSON: Any focusing adjustment that needs to be done is done on the lens barrel because if the flange/focal length is out it means the camera has been dropped or thrown or bashed and the whole internal casting (or the whole camera) will need to be replaced, anyhow. The whole focusing/flange mechanism is so well protected by the body casting that nothing less would throw this off. If viewing screen focus and alignment is messed up -- (if you haven't followed my earlier advice and have instead taken the whole viewing screen out) -- then you need to adjust focusing from side to side and corner to corner after checking the lens-to-film focusing. You can do this either by focusing on infinity or with a collimator.

CARN: If the mirror is at the wrong angle you will not get the image sharp over the whole focusing screen at the same time and it will cause focusing error between the film and the screen -- plus the film won't see the same picture that the mirror does. So, if necessary, you should set the mirror angle correctly BEFORE focusing the viewing screen. Ordinarily, adjusting the mirror angle isn't necessary. It's necessary only if the mirror is being replaced or the camera has been damaged. Some people do stick their finger into the camera and try to push the mirror down!

PARCHINSKI: The most disturbing problem with the mirror not at a 45 degree angle is that a normal lens will come to infinity focus and a telephoto will fall short or past infinity depending on its angle plus or minus from the 45 degree position.

CARN: To set the mirror angle, if you have the Hasselblad jig you put the body casting into the jig which is set up to read the mirror angle at exactly 45 degrees from the film plane. If you don't have the jig you can set this by mounting a target in the film plane and a target in the focusing screen plane and projecting them both through the camera lens alternately onto a piece of groundglass. Mark the film plane image on one side of the glass. Project the focusing screen image on the glass and adjust the mirror angle until this second image superimposes over the first.

ROKAHR: Another one of the pitfalls of the type Bill Carn mentioned -- the film plane must be parallel to the lens mount. This is where someone can go wrong when he's not even aware that the factory jigs exist. If the body sits cockeyed, the camera may focus OK only on one side or another, or only in the middle and so on. There are two variables causing this which are: (1) the "aperture plate" -- with a track between two ridges in which the magazine seats; (2) the lens mount, which is attached to the outer shell. When you reassemble and slide the housing and the mechaism together, both of these surfaces must be strictly parallel to each other and a precise distance from each other. To a CERTAIN extent you can see or feel if the aperture plate is higher on one side or the other. You can't see at all if the lens mount is parallel, though if it's obviously been bashed you have your doubts.

JONES: People say that this parallel measurement is very frequently off because the inner body is aluminum. If you have a heavy lens in front, even a heavy bump can cause a shift in the ±0.02 mm body tolerance -- and users are notoriously careless!

People tell me that if they find the surfaces are not parallel, they loosen the screws wherever there is a discrepancy in the parallelism and with a hard rubber or plastic mallet carefully tap it back into alignment. But how do you find out if the surfaces are not parallel in the first place?

ROKAHR: To adjust this well and efficiently I had a jig made. It's not a duplication of the factory jigs -- it's our own design. In designing we asked "What do we want to accomplish?" and then took the measurements off a good Hasselblad body. If you don't have a jig and if you happen to thave the customer's lens -- I prefer a standard lens -- and also the customer's magazine, then of course you can put film in the magazine and put the entire assembly under a collimator to adjust it. I prefer the jig because it makes assembly much easier and much more precise.

JONES: Rather than go into the jig more deeply now, I'll write a separate article about it. Now -- suppose someone doesn't have a jig. They also set the mirror angle correctly with the help of an autocollimator, so which do you adjust first?

ROKAHR: First, I check the camera visually to see if there's any obvious damage from a blow, at the same time finding out from the customer his specific complaint other than "It doesn't work." Second, I check the focus of the lens with the help of my back focus gauge and put the lens in focus. (I do sometimes run into a customer who insists the lens must be OK and insists I work only on the body. Then I'm stuck making all the adjustments on the body.)

Third, with the proper jig it's simple -- you can quickly and easily line up the aperture plate "track" and the lens mount so they're parallel to each other and at the proper distance from each other. This is harder to do just using an autocollimator.

Fourth, you check the viewfinder. If your image is not dead center in the groundglass, you know your mirror is off. Fifth, once you know your mirror is in the proper position you can align the viewfinder groundglass to proper infinity focus with the help of the autocollimator.

JONES: It might be helpful to a technician to also know the exact, measured, distance from the "aperture plate" to the lens mount. Braun's official figure for this is 71.40 mm ±0.03 mm.

PARCHINSKI: On to the subject of cleaning -- I use moly lube for sliding parts and fine oil on shafts and soft grease on cams, etc. A good cleaning solvent is tri-chlorothene.

CARN: Lubrication is important. I do not recommend washing and relubing with dry lube. Use instrument oil and grease.

PARCHINSKI: No, no! That's moly grease, not powder I'm using! I wouldn't use moly powder or graphite. Graphite is abrasive and should not be used unless that is the desired effect.

CARSON: The camera originally comes with gears greased and shafts oiled, so this is what I use too. The only sliding parts are in the shutter release assembly and grease is far better on heavy gearing like this. I don't like moly powder, either, because it impregnates things like shutter leaves. It causes a grey pallor on the shutter blades which you can't clean off! Moly is messier to work with than graphite, which you can clean off when you want to. However, in a Hasselblad I wouldn't use graphite either since this camera is designed to be lubed with grease and oil.

PARCHINSKI: For a discussion on sequence of operation and operation theory, get a copy of the June '76 Modern Photography.

JONES: The article in that issue, Modern's "Inside Your Camera Series #18, Hasselblad 500 C/M," can be ordered from: Modern Photography, 130 E. 59th Street, 15th Floor, New York, N.Y. 10022. Cost of the '76 June issue is $2. A limited quantity is left, so order now!

CARN: Of course this article was written for photo fans, not technicians, and from that perspective it is excellent. A repair technician would, in addition, want to have gear timing, operational sequence, alignment, tensions, etc. But the article is a good basic grounding for understanding the operating principles of the camera.

JONES: No two technicians repair the same camera in exactly the same way. I hope that people reading this discussion will write to contribute their own techniques and technical information on the Hasselblad 500.

HASSELBLAD JIGS

AND OTHER TOOLS

For technicians repairing a lot of Hasselblads but not wishing to invest thousands of dollars in special tools, Dieter Rokahr and his friend Oscar Lee are trying to market some Hasselblad jigs which will enable you to adjust these cameras more quickly.

Oscar Lee was born in the U.S. but went to China when he was young, returning to the States after WWII. He studied tool design and is now a tool & die maker for a Los Angeles firm, where he has been employed for 20 years. He has a son studying Forestry at U.C. in Sacramento and a daughter entering college to study architecture this fall.

Oscar has made back focus gauges and "non-scratch compasses" (similar to spanner wrenches) for local camera repair technicians, to their specifications. (He appreciates people giving him the dimensions in non-metric terms, to save time.)

In addition to these projects, Oscar has made a set of Hasselblad assembly jigs for SPT President Dieter Rokahr. Below, you see the "Model I" jigs. Oscar and Dieter have since improved on the design, making it lighter, cheaper and faster to use. The purpose of these "Model II" jigs is to quickly set up the camera so that the film plane is parallel to the lens mount. In addition to the jigs pictured, you need an 8 x 10" or larger surface plate to set them on. This must be toolroom grade to be precise enough. However, inspection grade is unnecessarily precise and more expensive. An appropriate plate, according to Dieter, is available for about $100. in tool & die catalogs and can be found for about $50. in Los Angeles at Sam's Tool Mart.

Oscar works on these tools at home and does not have the paperwork set up to market them. However, Dieter has agreed to market the gauges, compasses, and Hasselblad tools through his camera repair shop. Since the gauges are made individually to your specifications, you should ask for a quote on time and delivery. The Model II Hasselblad jig will cost hundreds, rather than thousands, of dollars. As a starting point, Dieter and Oscar have priced the jig set (not including surface plate) at $300.

For the future, Dieter and Lee hope to also develop a Hasselblad mirror alignment feature to add to the jig. The Hasselblad factory instrument is a square jig which holds the camera body, surrounding it on all four sides. The flat bottom of the jig is the reference point. On one side of the jig there is a little telescope/microscope "viewfinder" attached through a 45 degree angle sleeve. Looking through this, you see an approximately 1 cm diameter round opening with a little circle (about 4 mm diameter) inside it. The circle is the reflection from the mirror. You center the little circle in the center of the round opening, almost like using a spirit level. Although you seldom need to adjust, with this handy feature you can quickly check to see if everything is lined up.

If you are interested in these tools, contact: Dieter Rokahr, R.D. Rokahr Camera Service, 6757 Tampa Ave., Reseda, Ca. 91335, or phone (213) 881-1316.

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THE NEW COPYRIGHT LAWS

AND HOW THEY AFFECT CAMERA REPAIR MANUALS

By Peggy Jones

The government has recently passed new, stiffer, copyright laws. Previously, students, teachers, and individuals in general have felt it was alright to photocopy or otherwise duplicate copyrighted materials for their own use as long as they did not sell them. This is not true. "One-time use", only, is legal. For example, a student may copy materials to be used as references for a term paper; however once the paper is completed he should throw away the photocopies. If he keeps them as part of an "anthology" he's collecting, which he'll refer to again and again, he's breaking the law.

In a technical field such as camera repair where there is an enormous amount of new technical material to be absorbed every year, and where the cost of maintaining an up-to-date reference library gets bigger every year, only somebody extremely short-sighted would discourage technicians from getting as much information as possible and from sharing technical information. However, if you are not careful a problem may arise.

One manufacturer I talked to said it was fine with him if a technician wanted to reproduce some copyrighted manual pages for a friend; however it had happened in the past that one technician had not only shared among friends but had sold, commercially, copies of the manufacturer's copyrighted manuals. Since the technician had only the printing costs, none of the expenses of paying writers, artists, typesetters, etc., naturally he was able to sell them a lot cheaper than the manufacturer did. But customers did not realize this and asked the manufacturer, "How come you're charging so much more for <u>your</u> copies of the manuals?" An embarassing situation which caused some ill-will and reflected on all camera repair technicians!

Now, not being in the printing business, technicians may not be in the habit of noticing whether or not a piece of technical information is copyrighted. Much is <u>not</u> and can, therefore, be reprinted, sold, or whatever you wish. However, if it is copyrighted this is a notification that the company has put time, effort, and money into producing it -- an investment which they want to get back by selling you <u>their</u> copies of the material.

Although it is difficult, if not impossible, to enforce the law against individuals reproducing copyrighted material, consider that if people widely reproduce such material the camera manufacturer may decide they cannot recoup enough of their expense and hencforth will develop only limited parts lists, etc., for their own in-house use.

While it is a problem for many small shops to find the money necessary to pay for service information on the ever-increasing number of sophisticated cameras on the market, it is an expense a shop must meet if it is to survive. Although it would be nice if manufacturers gave service information away free, this is wishful thinking. If giving manuals away free really did enable a manufacturer to sell more cameras and make more profits in the long run, then the manufacturer's expert marketing analysts would long since have instituted such a free-manual policy. As we know, such is not the case.

It therefore behooves the camera repair shop or technician to notice whether or not a given piece of material is copyrighted and abide by the law and the author's wishes. Copyrighted material can, of course, be duplicated <u>if</u> you receive the publisher's permission.

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HISTORICAL NOTE--

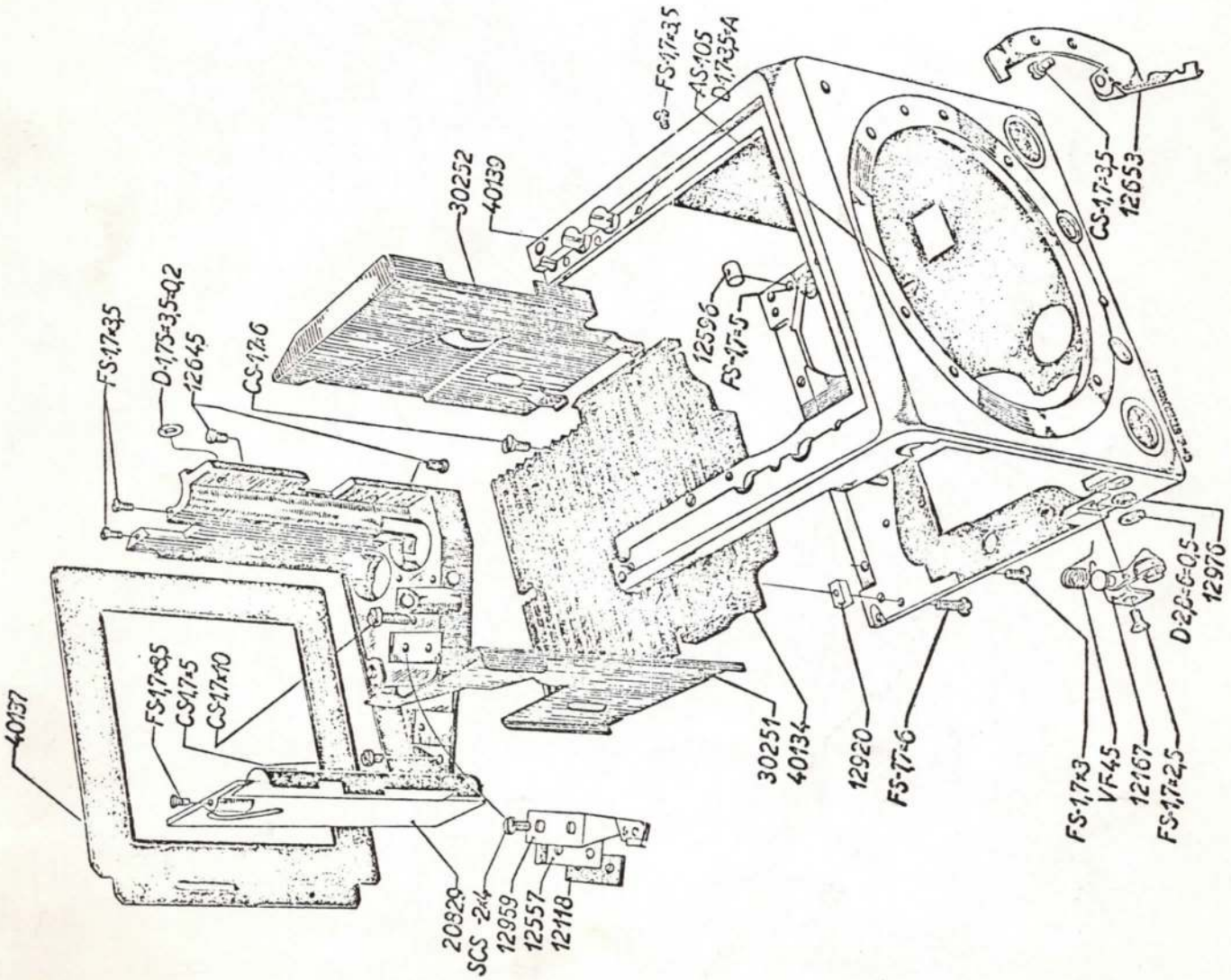
HASSELBLAD 1000 F RESURRECTED

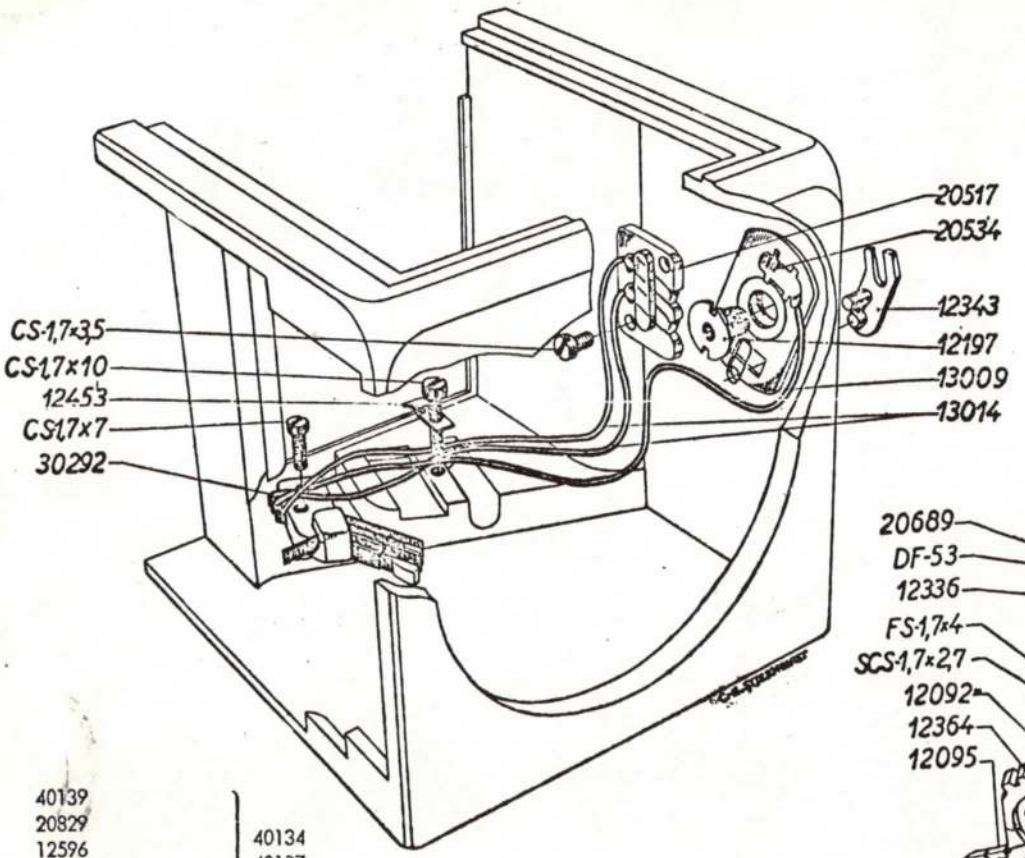
As we go to press..... We have just heard that Harrison Camera Corp., 249 Post Ave., Westbury, N.Y. 11590, (516) 334-2000, will be importing a Russian copy of the Hasselblad 1000 F.

How many of these will be sold in the U.S.? Will parts be imported and sold? How many parts will actually be interchangeable with the Hasselblad version? The answers are still unknown.

However, Hasselblad collectors who like to restore the 1000 F may find renewed interest in these cameras, even though parts are no longer available from Hasselblad. Therefore, here are some exploded views of the original Hasselblad 1000 F parts manual. These are taken from about a tenth-generation photocopy and we have left some of the original technician's notes and scribbles. (These drawings are not part of the $12. Hasselblad fiche set available from SPT, as that set covers only current models.)

As you can see this is by no means a complete repair manual and -- since the 1000 F is very different from anything you'll see today -- if after looking at the illustrations you want to send the camera elsewhere to be restored, SPT can refer you to some old-timers who specialize in these.





40139	
20829	
12596	
CS – 1.7×10	40134
CS – 1.7×5	40137
D – 1.75×3.5×0.2 (2)	40141
FS – 1.7×3.5 (5)	30251
FS – 1.7×5 (2)	30252
	12118
	12167
	12557
	12645 (2)
	12653
	12920 (2)
	12959
	12976
	AS–105 (2)
	CS–1.7×3.5 (2)
	CS–1.7×6
	D–1.7×3.5×A (2)
	D–2.8×6×0.5
	FS–1.7×2.5
	FS–1.7×3 (3)
	FS–1.7×6 (2)
	SCS–2×4 (2)
	VF–45

Sync Shoe
12559

30292	
20517	
20534	20853 — HARNESS
13009	12197
13014 (2)	12343
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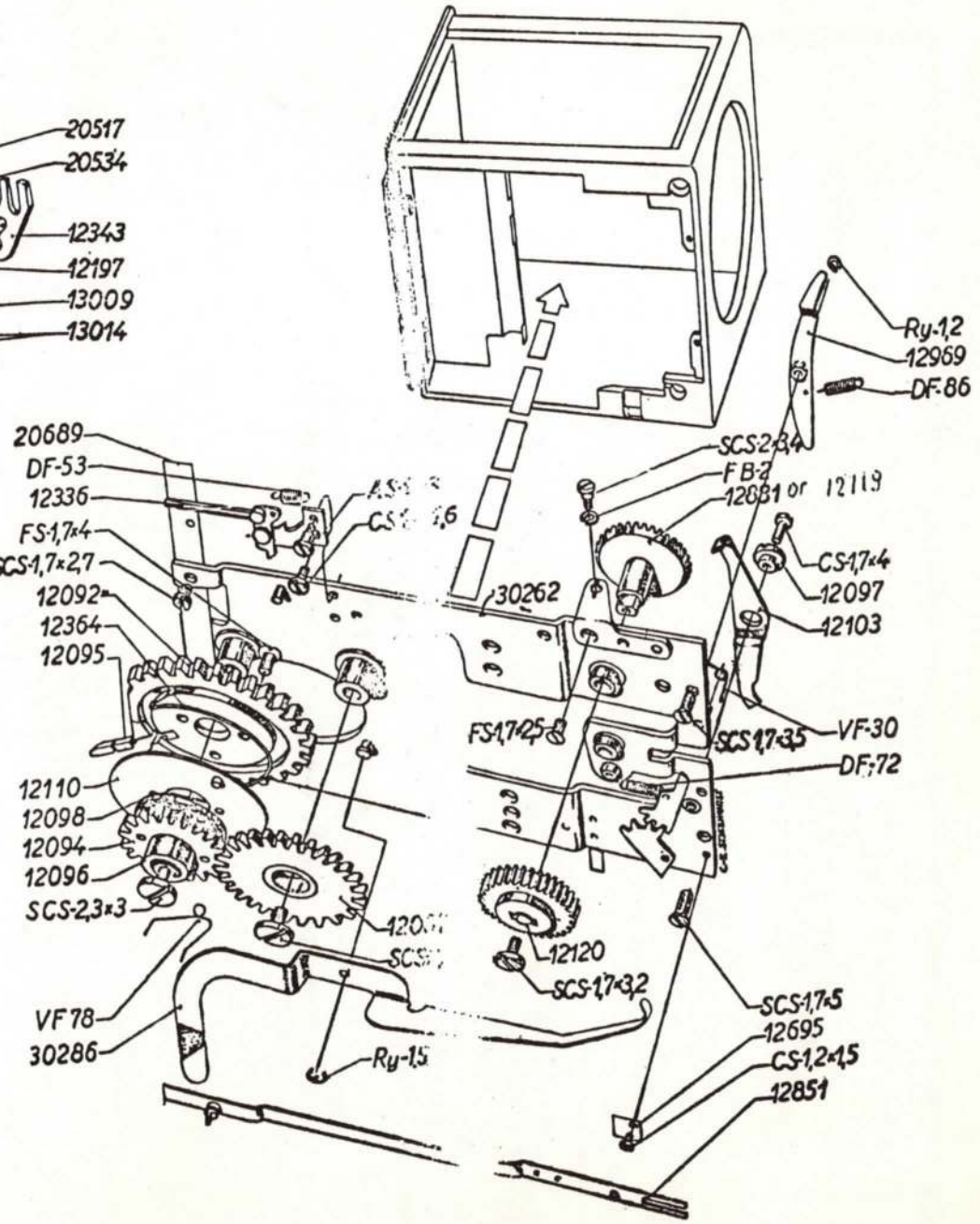
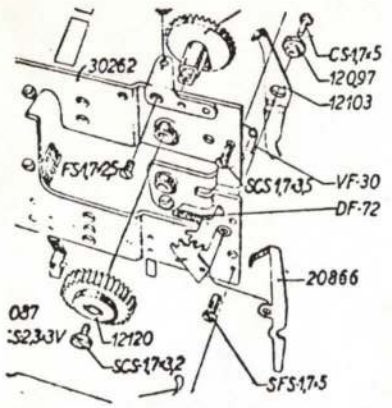
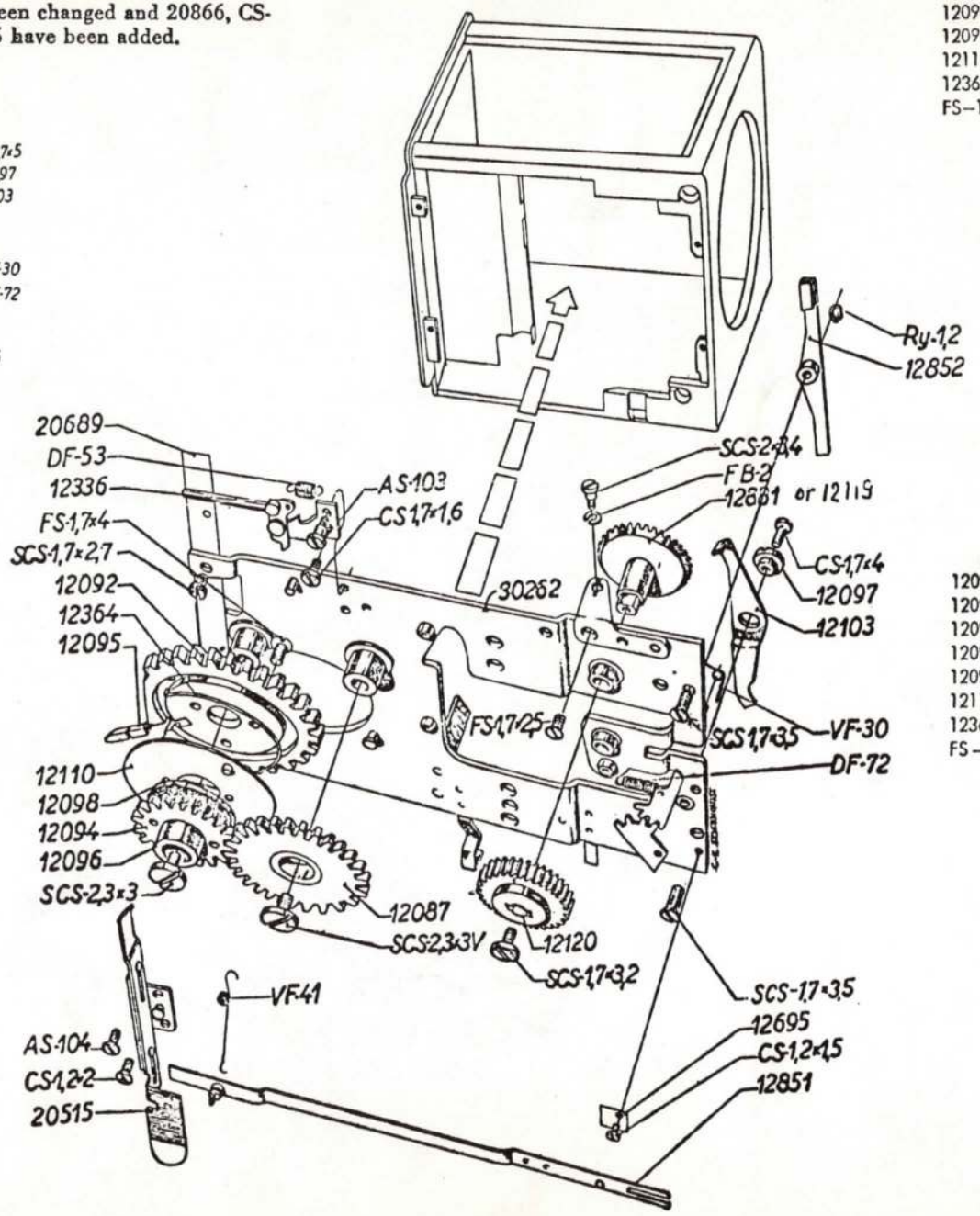


On cameras numbered 20882 onwards parts No. CS-1,7×4 and SCS-1,7×5 are deleted.

5. 8. 56. Part No. 30262 has been changed and 20866, CS-1,7×5 and SFS-1,7×5 have been added. SVL No. 5/56.





12092
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12098
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12364
FS–1.7×4 (2)

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12087
12091
12097
12103
12120
12881
12969
CS–1.7×4
DF–72
FB–2
Ry–1.2
SCS–1.7×3.2
SCS–2×3.4
SCS–2.3×3 V
VF–30

30263
30286
20869
12336
12695
12851
AS–103
CS–1.2×1.5
CS–1.7×1.6
DF–53
DF–86
FS–1.7×2.5
Ry–1.5
SCS–1.7×2.7 (2
SCS–1.7×3.5
SCS–1.7×5
VF–78

12092
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FS–1.7×4 (2)

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FB–2
Ry–1.2
SCS–1.7×3.2
SCS–2×3.4
SCS–2.3×3
SCS–2.3×3V
VF–30

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20689
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12695
12851
AS–103
AS–104
CS–1.2×1.5
CS–1.2×2
CS–1.7×1.6
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FS–1.7×2.5
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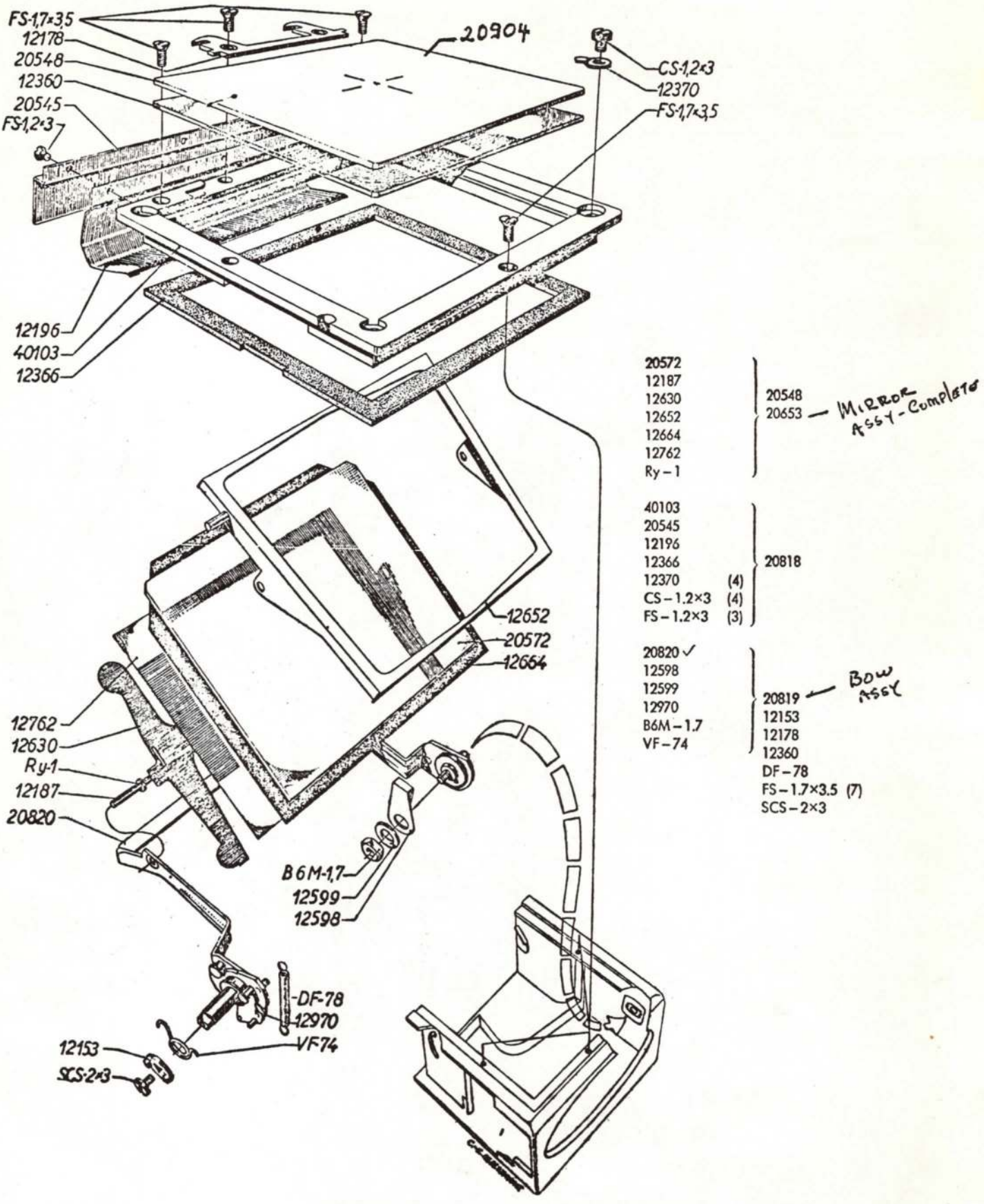
SCS–1.7×3.5 (2)
VF–41



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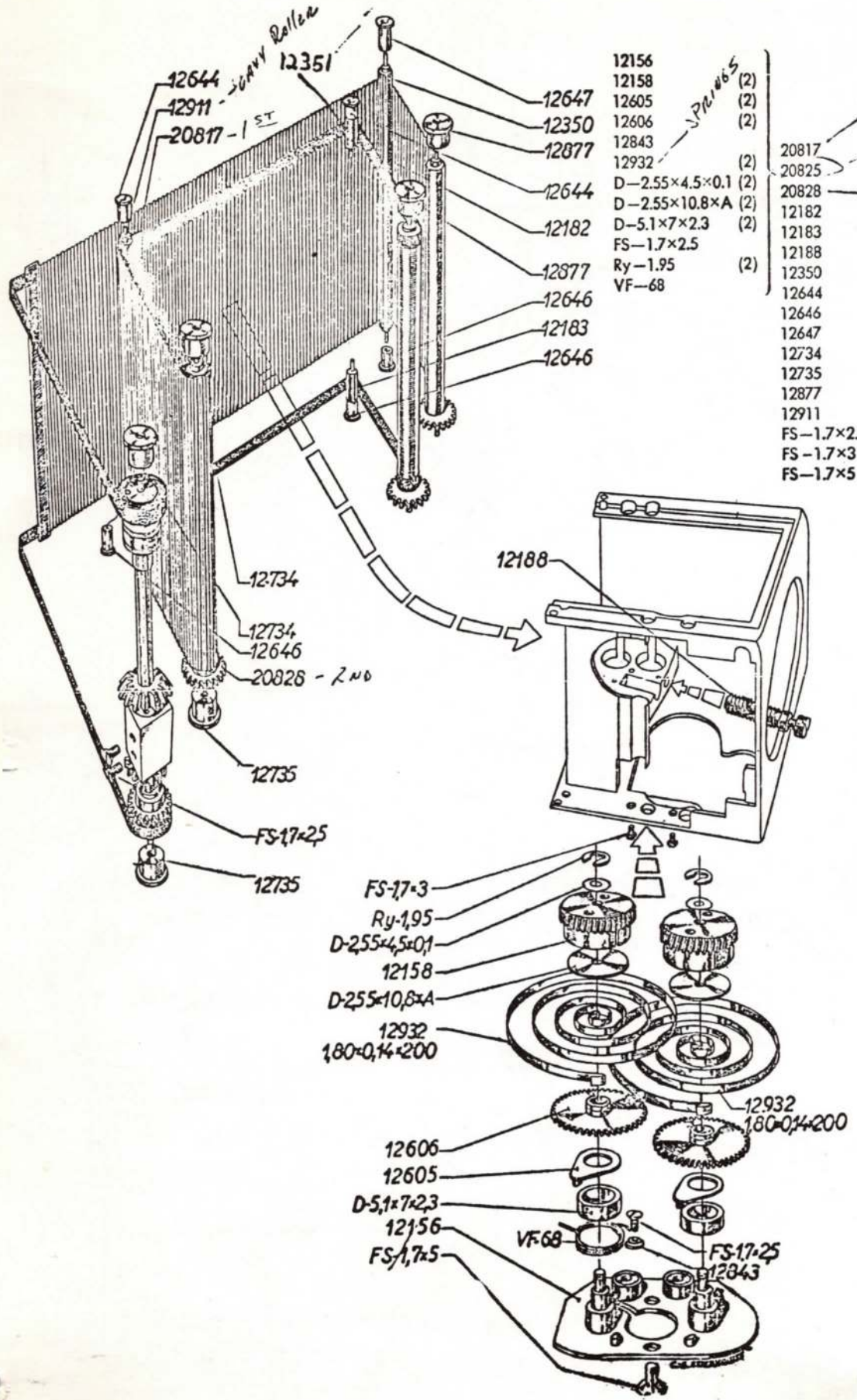
12187		
12630		20548
12652		20653 — MIRROR ASSY - COMPLETE
12664		
12762		
Ry – 1		

40103		
20545		
12196		
12366		20818
12370	(4)	
CS – 1.2×3	(4)	
FS – 1.2×3	(3)	

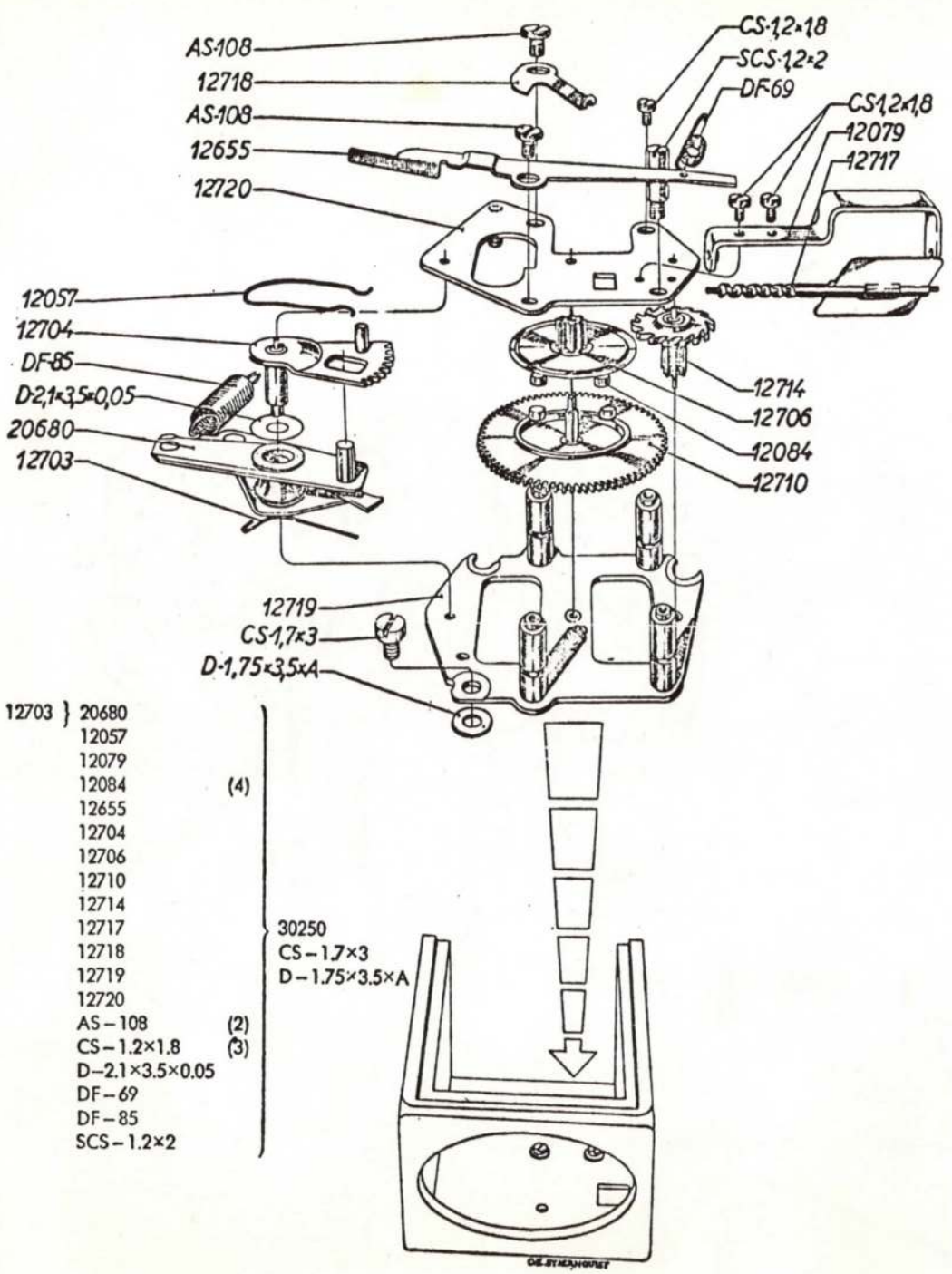
20820 ✓		
12598		
12599		20819 — BOW ASSY
12970		12153
B6M – 1.7		12178
VF – 74		12360
		DF – 78
		FS – 1.7×3.5 (7)
		SCS – 2×3

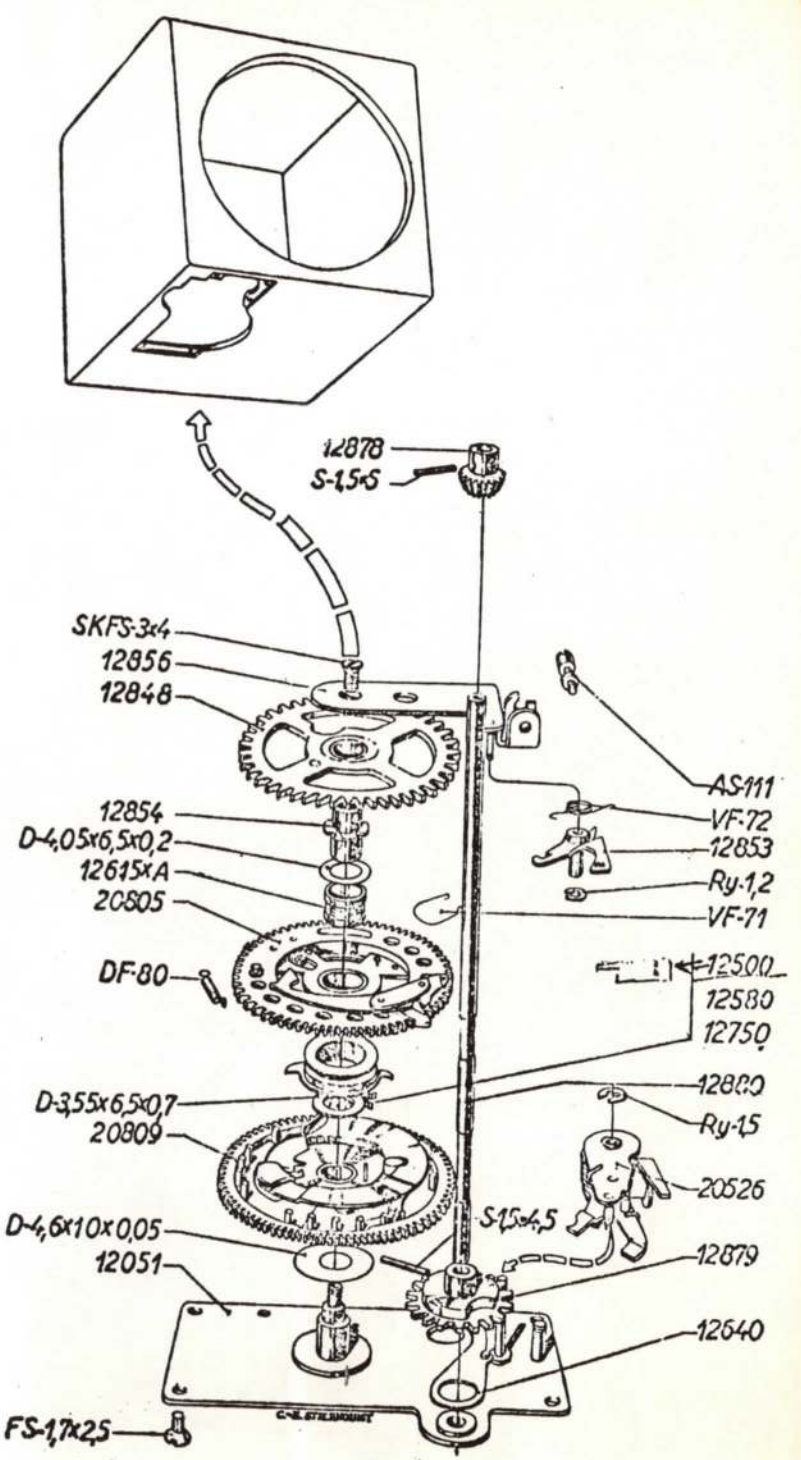


12156		
12158	(2)	
12605	(2)	
12606	(2)	
12843		
12932	(2)	
D—2.55×4.5×0.1	(2)	
D—2.55×10.8×A	(2)	
D—5.1×7×2.3	(2)	
FS—1.7×2.5		
Ry—1.95	(2)	
VF—68		

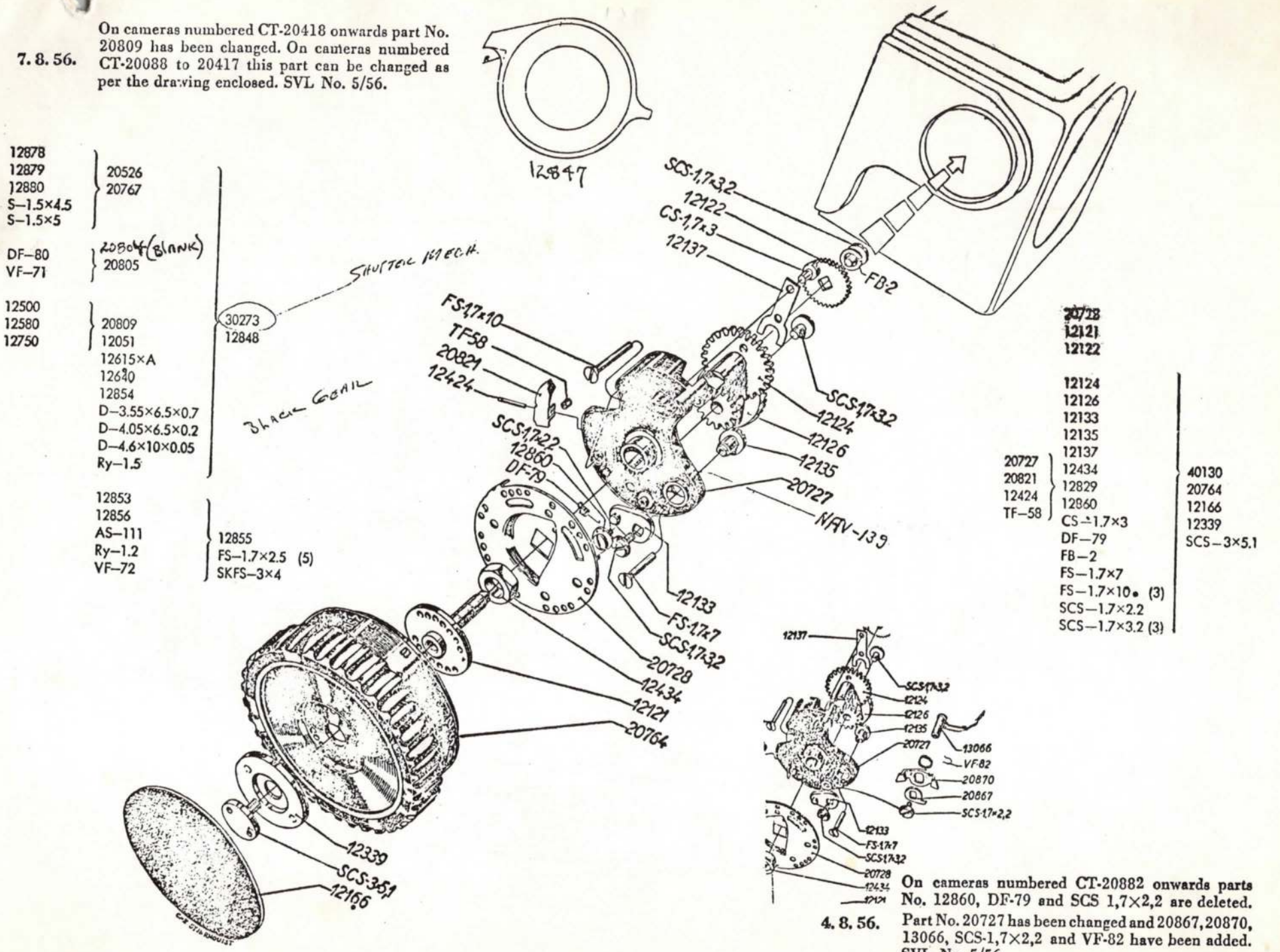
#1. Custom Spring Hanger assy.

20817		
20825		
20828		#2 Custom
12182		
12183		
12188	(2)	
12350		
12644	(2)	
12646	(3)	
12647		
12734	(2)	
12735	(2)	
12877	(2)	
12911		
FS—1.7×2.5	(2)	
FS—1.7×3	(2)	
FS—1.7×5	(2)	


AS-108
12718
AS-108
12655
12720
CS-1,2×1,8
SCS-1,2×2
DF-69
CS-1,2×1,8
12079
12717
12057
12704
DF-85
D-2,1×3,5×0,05
20680
12703
12714
12706
12084
12710
12719
CS-1,7×3
D-1,75×3,5×A
12703 } 20680
12057
12079
12084 (4)
12655
12704
12706
12710
12714
12717
12718
12719
12720
AS-108 (2)
CS-1.2×1.8 (3)
D-2.1×3.5×0.05
DF-69
DF-85
SCS-1.2×2
30250
CS-1,7×3
D-1.75×3.5×A


12878
S-1,5×5
SKFS-3×4
12856
12848
AS-111
12854
D-4,05×6,5×0,2
12615×A
20805
VF-72
12853
Ry-1,2
VF-71
DF-80
12500
12580
12750
D-3,55×6,5×0,7
20809
12800
Ry-15
20526
S-1,5×4,5
D-4,6×10×0,05
12051
12879
12640
FS-1,7×2,5

7. 8. 56. On cameras numbered CT-20418 onwards part No. 20809 has been changed. On cameras numbered CT-20088 to 20417 this part can be changed as per the drawing enclosed. SVL No. 5/56.

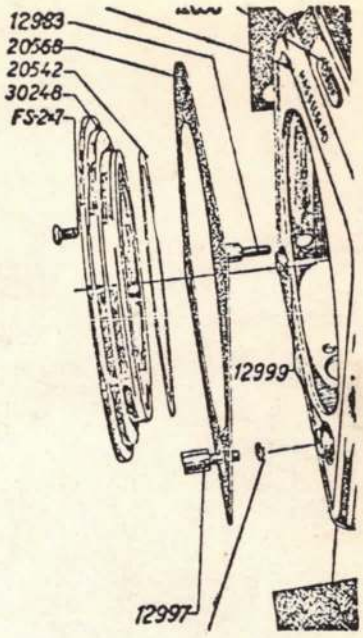


4. 8. 56. On cameras numbered CT-20882 onwards parts No. 12860, DF-79 and SCS 1,7×2,2 are deleted. Part No. 20727 has been changed and 20867, 20870, 13066, SCS-1,7×2,2 and VF-82 have been added. SVL No. 5/56.

On cameras numbered 17501 onwards

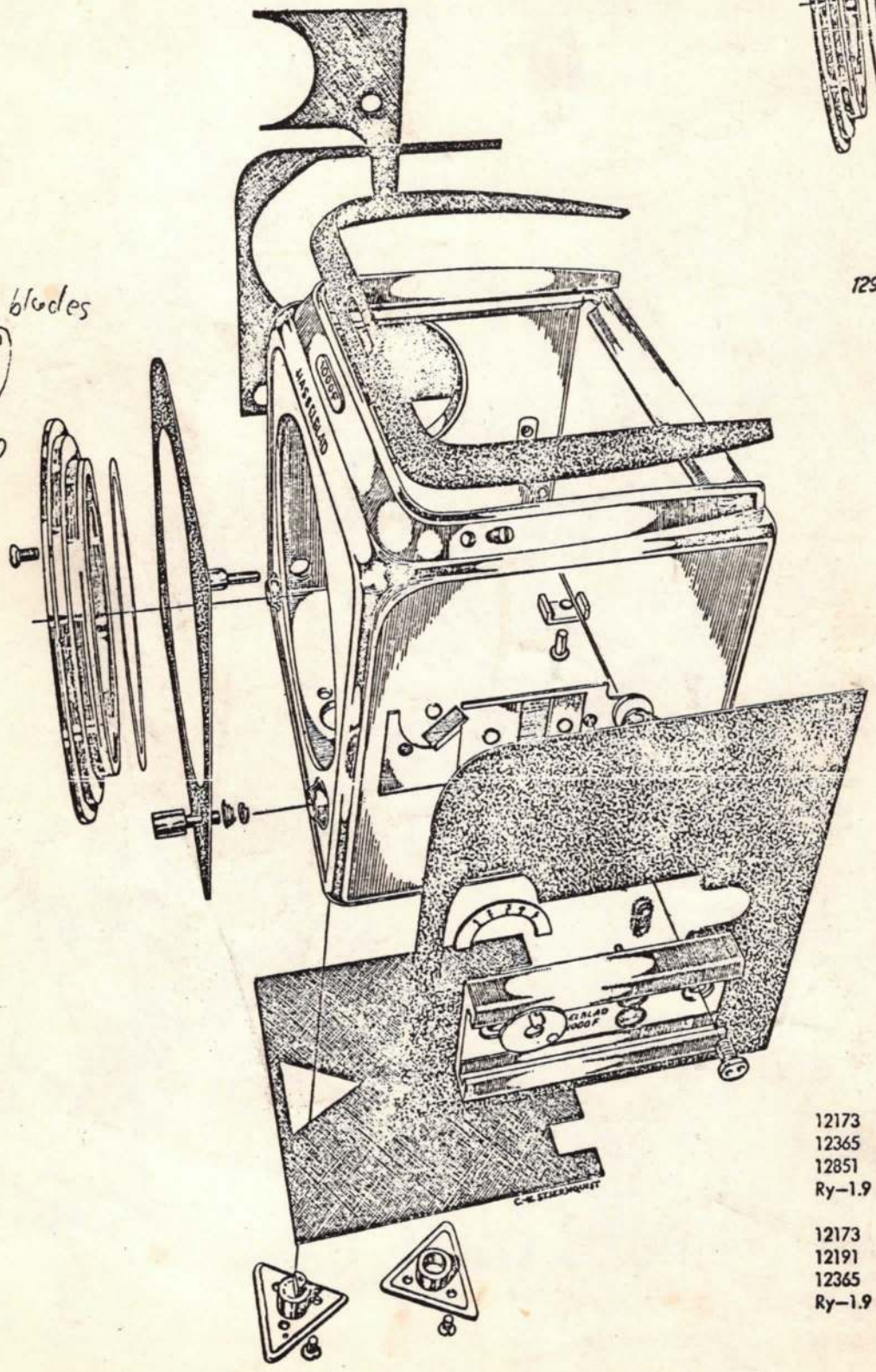
6.8.56

part No. 12751 has been changed to 12933
» » 12550 » » » » 12987
» » 12549 » » » » 12988
» » 12191 » » » » 12997
» » 12173 » » » » 12999
and » » 12365 is deleted.
'SVL No. 5/56.

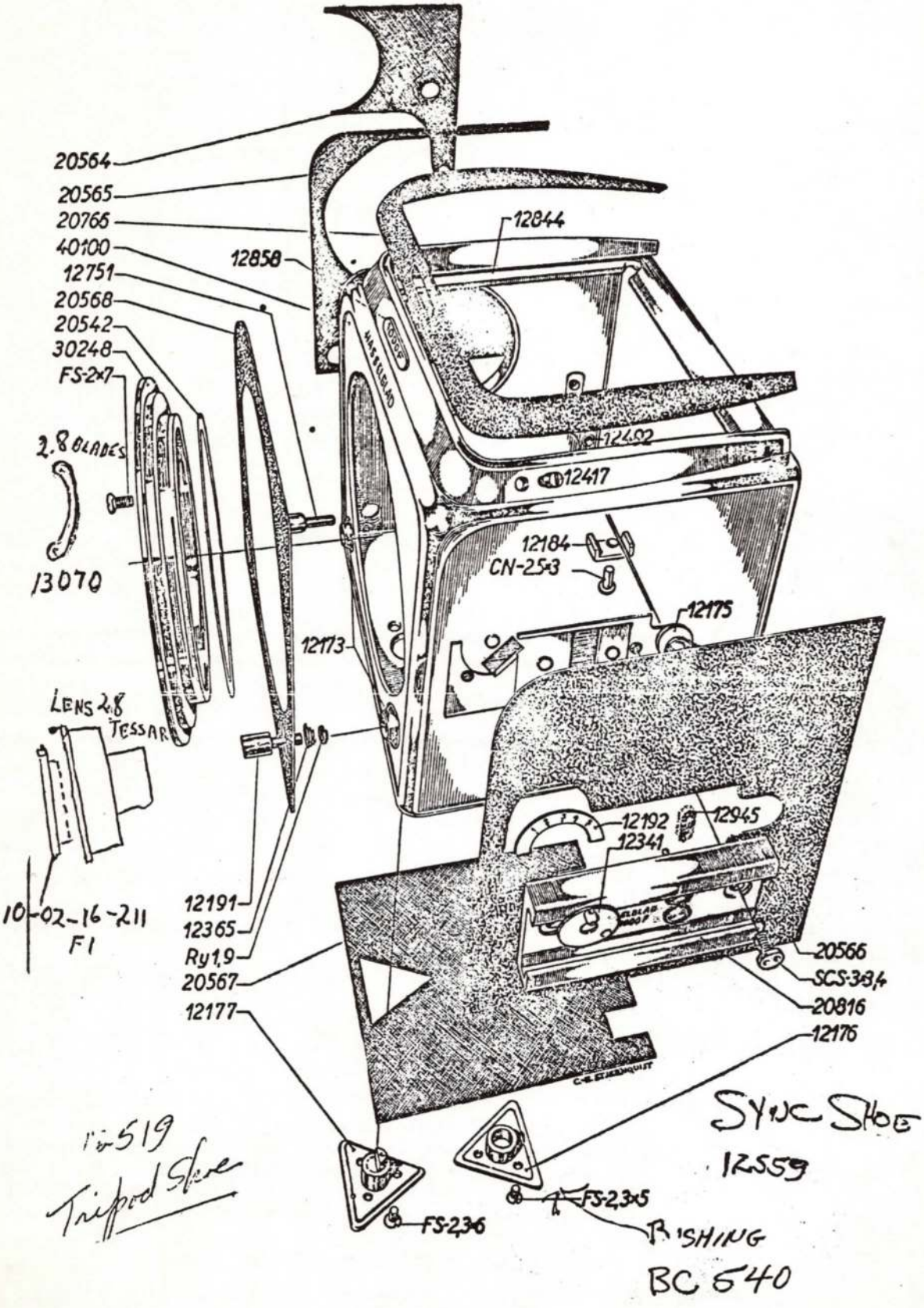


2,8 blades

13070



	40100		
	20564		
	20565		
	20566		
	20567		
	20568		
	20766		
	12175	(2)	
	12184	(2)	
	12192		30248
	12417	(2)	30271
12173	12492		20542
12365	12549		20816
12851			12176
Ry–1.9			12177
			12341
12173			12945 (2)
12191			FS–2×7 (4)
12365	12550		FS–2.3×5 (4)
Ry–1.9	12844		FS–2.3×6 (3)
	12858		SCS–3×3.4 (2)
	CN.–2.5×3	(2)	


20564
20565
20766
40100
12751
20568
20542
30248
FS-247
2.8 BLADES
13070
LENS 2.8 TESSAR
10-02-16-211 F1
12858
12844
12402
12417
12184
CN-25-3
12175
12173
12192
12945
12341
12191
12365
Ry1.9
20567
12177
20566
SCS-38,4
20816
12176
FS-236
FS-235
BUSHING
BC 640
SYNC SHOE
12559
1-519
Tripod Shoe

Classified Ads

Classified Ads are 10 cents a word. Numbers count as words.

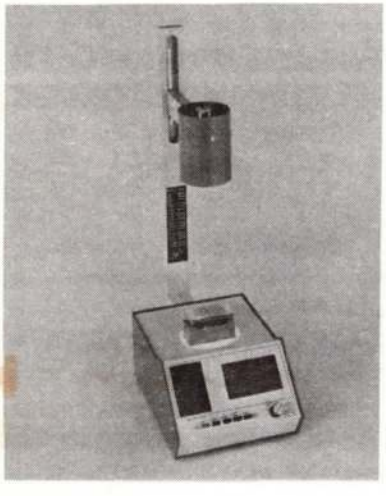
FOR SALE: Lens forcus gauges for Nikkor (Bayonet Lenses & Pentax (Screw) Lenses. Gauges made of solid steel. Cost: $45. ea. or buy both for $80. Check and adjust lenses w/o need of a camera body. Gauges guaranteed returnable within 10 days of receipt for refund if not satisfied. Delivery approx. 2 - 3 weeks upon receipt of your order. Add $3. shipping charges for each order. Order from: Bloomington Camera Service, 223 S. Pete Ellis Dr., Bloomington, In. 47401.

MOTION ANALYZER MARK IV For Sale. Contact Keith's Camera, 700 A, W. Lodi Ave., Lodi, Ca. 95240. (209) 334-0586.

INTERESTED IN SELLING Horton Camera Repair. Established shop in business for 30+ years. Located in So. Calif. (Orange County). Excellent potential for expansion or can remain one-technician operations. For details, call Shelley Horton, owner, (714) 547-1189. Horton Camera Repair Service, 100 South Hathaway St., Santa Ana, Ca.92701.

MANAGEMENT OPPORTUNITY: Operate a camera repair shop 2/o all the initial hassles of opening a business. We require a person with drive and who enjoys working with customers. Min. 1 yr. repair experience preferred. Send personal profile & qualifications to: Ken Winans, President, Action Camera Repair Inc., 1429 Estes St., Lakewood, Co. 80215.

USED TEST EQUIPT. WANTED: Need the basics: collimator, shutter tester, EE tester, etc. Contact: Joe Careta, Camera Clinic, 911 E. Main St., Stamford, Ct. (203) 324-3799.



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- Shutter speeds of both vertical and horizontal curtain cameras have 3 points on the focal plane checked simultaneously. Depressing another button allows the 2 curtain speeds to be displayed simultaneously.
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- Designed by camera repairmen, example: a 13 inch high distance between light source and sensor to take care of the Hasselblad with lens.
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- Hundreds built since 1969 and all Camline Instruments have the 1 year unconditional guarantee.

MODEL 22 $825.00

Our Automatic Camera Tester, the Model A40, that has been undergoing testing in the San Francisco Area is now available, introductory price is $1200 complete. Accessories included are the Super 8 Sensor and formats for 6x4.5, 6x6, 6x7, 110, 126 still cameras. The A40 closely adhers to the suggested ANSI specifications. The light box is calibrated in 6, 9, 12, and 15Ev. Call or write for a demonstration or loaner or further particulars.

hfe

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EST: 1969